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Engagement of Small- to Medium-Sized Enterprises in Energy Efficiency in Australia: A Review of the Facilitative Walkthrough Approach

By: Winnie Killick

B.Sc. (Hons), Grad. Dip. Comp

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Declaration

The following study is based on the author's own assessment of the engagement of small- to medium-sized enterprises in energy efficiency using the Facilitative Walkthrough Approach. Where the author has relied on work by others, this is appropriately acknowledged.

Abstract

Although greenhouse gas emissions from each small business are usually relatively small, the collective emissions from small and medium-sized enterprises (SMEs) are significant due to their relatively large numbers. A number of different approaches have been used for assisting SMEs in making energy efficiency improvements in recent years. Some of these are more successful than others in instigating actions, but a lack of reporting and measuring standards make it difficult to assess their relative effectiveness.

In 2007- 8, the Southern Metropolitan Regional Council reported great success with its Climate Actions project which engaged SMEs using the Facilitative Walkthrough Approach (FWA). This dissertation is a review of the FWA to ascertain how effective it was in instigating energy efficiency changes in the target businesses. As part of the research, major barriers facing SMEs and the common approaches of engagement were identified. A set of 'universal' Indicators of Success was developed to aid the objective evaluation of the FWA.

The research found that the FWA, as implemented in the Climate Actions project, was very effective in instigating behavioural, low- to medium-cost technology and cultural changes in the surveyed SMEs. However, the micro- to small-SMEs were reluctant to make high-cost technology changes as the cost barrier remained a major impediment. Facilitation and relationship building were instrumental in bringing about technology and cultural changes, whereas the face-to-face conversations and walkthrough audit were important strategies, which worked in tandem to break down the barriers to behavioural changes.

With some modification, or a shift in the emphasis in strategy implementation, the FWA can be easily adapted to other audiences. An adapted FWA can be applied to a large business or to the residential sector. New combinations of certain successful strategies may also be used in future projects.

With the long-awaited government policy focus again shifted toward business energy efficiency, the time has come for the development of really effective programs to assist this hard-to-reach sector. Objective evaluation of the various approaches and the identification of successful strategies will help to achieve this aim, and ensure that public money and efforts are well spent, by applying them to the most promising initiatives and approaches.

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Chapter 1 Introduction

1.1 Background

According to the Australian Bureau of Statistics (2002), 96% of non-agricultural private sector businesses are Small to Medium-sized Enterprises (SMEs). Greenhouse gas emissions from industry and large businesses are many orders of magnitude higher than those from small businesses due to their size and more energy intensive activities. However, the collective emissions[1] from SMEs are significant due to their relatively large numbers (Department of Climate Change 2006).

The issue of greenhouse gas abatement has moved up the national agenda in recent years. Alongside the use of more renewable energy sources for power generation, the improvement of energy efficiency is an essential strategy in reducing Australia's greenhouse gas (GHG) emissions (Young 2003). In recognition of this, the Australian Government launched the National Framework for Energy Efficiency in 2004 (MCE), and the National Partnership Agreement in Energy Efficiency in 2009 (COAG). It is setting in place initiatives to assist householders and businesses to become more energy efficient.

Whilst various government initiatives and programs, such as the Energy Efficiency Opportunities program (DRET 2009), target larger businesses, the SME sector has been relatively neglected. This is partly due to a lack of understanding of how best to engage this very time and resource poor sector. Government incentives such as part-funding of actions to reduce energy use through the Retooling for Climate Change

[1] Data for the quantification of the collective emissions from SMEs is not available, as SMEs are found across many commercial and industrial sectors, whereas emission statistics are generally calculated by sector, rather than by the size of business.

program (AusIndustry 2008) are well beyond the reach of the smaller SMEs, due to the large amounts of co-contribution required from the business.

Small businesses face many barriers along the journey to better energy efficiency, some of which the owners are not even aware of themselves (Jennings & Bustamante 2007). Without support from energy experts, they have neither the necessary knowledge to identify energy saving opportunities, nor the access to specialist suppliers of energy efficient products and services (Favacho & Pekin 2008). Financial and time constraints also get in the way of seeking expert advice such as commissioning an energy audit or attending workshops (Jennings 2008). A specialised approach is obviously needed for this very hard-to-reach sector.

1.1.1 Climate Actions Project and the Facilitative Walkthrough Approach

In early 2007, the Climate Wise team at the Southern Metropolitan Regional Council (SMRC) launched the federally funded Climate Actions project (SMRC 2008) after a successful pilot program. The project used a new Facilitative Walkthrough Approach (FWA) to engage around 90 small businesses in taking energy efficiency measures over a sixteen month period. The approach, developed by Dr Stephanie Jennings, was loosely based on the "enterprise facilitation" approach, pioneered by Ernesto Sirolli (1999). Sirolli's approach utilizes an Enterprise Facilitator (EF) to assist motivated entrepreneurs in developing small businesses by doing much of the legwork for them. He recognized the fact that entrepreneurs may have very good business ideas but may lack the necessary skills to transform these ideas into successful businesses. The EF's role is to assist the entrepreneur in achieving just that by providing expertise, guidance and support. In a similar way, the Facilitative Walkthrough Approach

employs a Green Enterprise Facilitator (GEF) to do the legwork in assisting the SMEs achieve better energy efficiency.

The Climate Actions project moved away from the checklist energy audit approach, which normally entails a visit from an auditor followed by a printed report/list of recommendations for the owner/manager. Instead of an audit, a quick walkthrough was conducted by the facilitator and on-the-spot 'tailored' advice and assistance were offered to the business owners to help them take actions. In recognition of the time poor nature of the sector, much of the legwork was also done by the facilitator in sourcing energy efficient products and services. The FWA was reportedly very successful in assisting a number of small businesses in reducing energy use in the project (SMRC 2008).

It seems that the FWA may be one of those specialised approaches which have been very effective in reaching the SME sector. However, there is no easy way to determine an approach's success and compare that to other approaches. Not only is there a lack of standardised protocol, project reports are also prone to bias and emphasis on the more successful aspects of the project. An objective review, through qualitative and quantitative data analyses, is therefore necessary to gauge the (true) success of any approach. At the same time, some standardised success indicators, independent of the strategies or their implementation, have to be developed to ensure that comparisons of the relative success of different approaches can be made.

1.1.2 Research Questions

In reviewing the effectiveness of the FWA, five research questions needed to be answered:

1. What are the perceived and other barriers facing SMEs, and the incentives for them to improve energy efficiency?
2. How effective is the FWA in engaging SMEs in energy efficiency measures?
3. What are the major factors influencing the engagement outcomes?
4. Are there any improvements which can be made to the methodology or in-field application to achieve better outcomes?
5. What are the prospects of adapting the FWA to other sectors?

1.2 Research Objectives

The research questions were answered by addressing the following research objectives:

- Determination of the perceived and market barriers facing SMEs, and incentives for SMEs to improve energy efficiency;
- Development of an evaluation methodology and use it to review the effectiveness of the Facilitative Walkthrough Approach in engaging SMEs in EE measures;
- Determination of the major factors of success of the FWA, and other influencing factors in the outcomes for Climate Actions project;
- Determination of any future improvements in the FWA and its in-field implementation to achieve better outcomes;
- Exploration of possible adaptation of the FWA to other sectors.

1.3 Methodology

The research was carried out in seven phases, as shown in the Methodology flowchart in Figure 1-1:

1. *Literature review* of printed and online publications was conducted to identify the major barriers facing SMEs and some of common approaches used for engaging SMEs in EE measures in recent years.
2. *Collection of relevant data* was accomplished by requesting access to the Climate Actions project data, and the design/conducting of a business participant survey (Appendix II) and an expert survey (Appendix III).
3. *Data analysis* was approached in three different ways:
    a. *Content analysis* of the project notes and data, as well as the business participant survey, was performed to identify the actions taken and the barriers that were overcome;
    b. *Quantitative analysis* of the project data and business participant survey was performed to quantify the EE actions that were taken by the businesses and their effect in reducing energy use and cost; and
    c. *Qualitative analysis* of the project notes and business survey was performed to determine the voluntary EE actions taken by the businesses (within the project timeframe and in the twelve months since completion of the project) and their feedback on how the FWA has assisted them in becoming more energy efficient. The business and expert surveys were also analysed to ascertain possible future improvements for the FWA.
4. *A set of Indicators of Success was developed* by categorising the business actions that resulted from major barriers being overcome. The impact of these EE actions

was then quantified and different sets of weightings were applied to the Business Indicators of Success to yield a spread of Business Success Scores. The most appropriate set of weightings, which best represented the individual business EE improvement outcomes, was adopted. Three Project Indicators of Success were also developed for evaluating the effectiveness of a project in targeting its audience, instigating actions and assisting the businesses in making energy savings.

5. *A review of the effectiveness of the FWA* was carried out by applying the Indicators of Success developed in the previous phase of research. The business survey and project data were analysed to identify which barriers were addressed to instigate the EE actions taken. Other factors influencing the project outcomes, but not related to the FWA, were also determined.
6. *The FWA's major factors of success were determined* by analysing the data to see if there was any correlation between the strategies employed and actions taken. The roles of the facilitator and the importance of the various FWA strategies in instigating changes were also explored.
7. *The possible adaptation of the FWA to other sectors* was explored and discussed, based on the opinions collected in the expert survey.

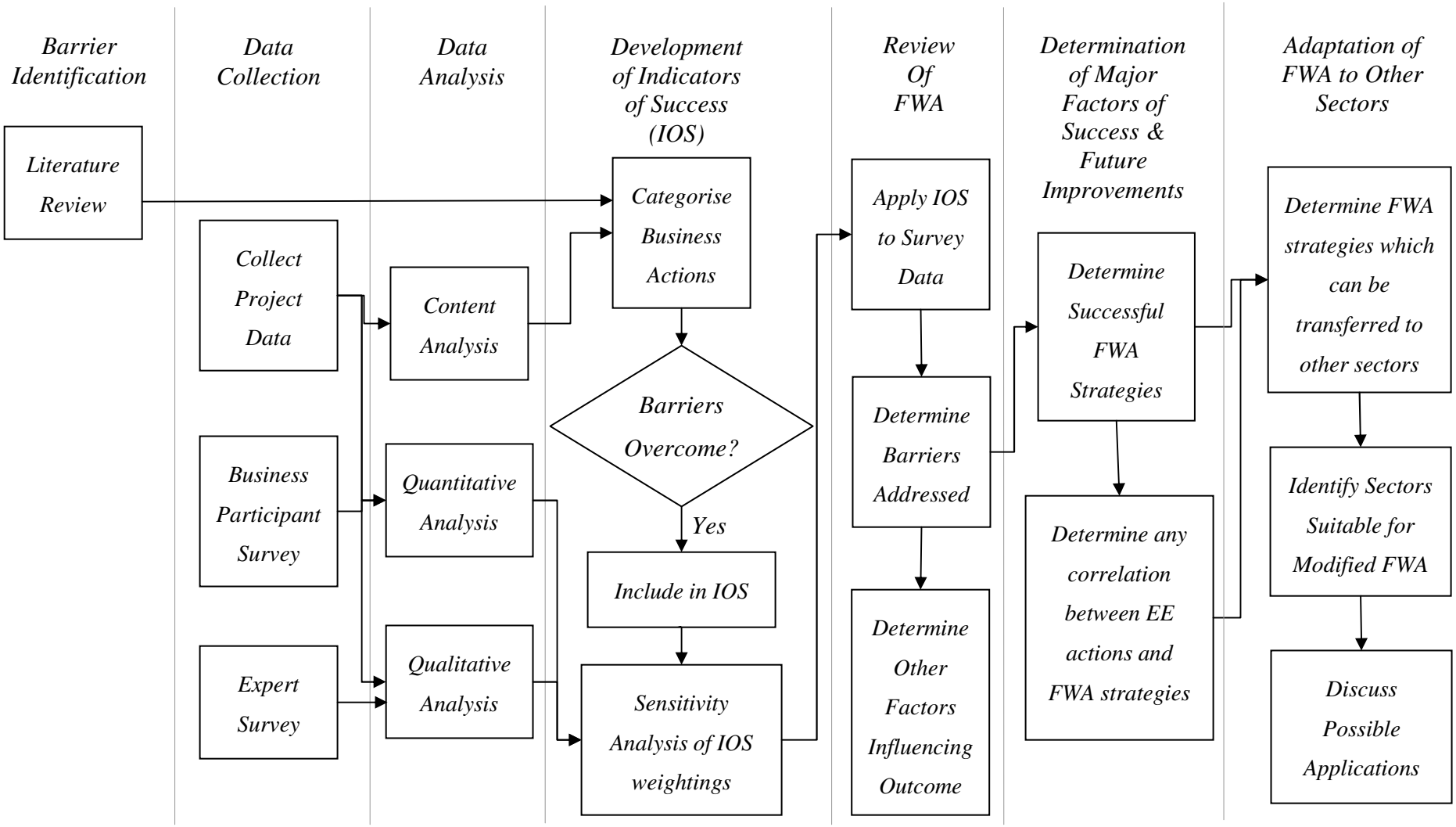


Figure 1-1 Methodology flowchart showing the seven phases of research

1.4 Scope and Limitations of the Research

Owing to the constraints on the author's time and resources, the scope of this project is mainly confined to the SME research and engagement approaches practised in Australia in recent years. One SME engagement approach in Canada, however, was included as the information and project experience became available through the author's personal contact with the Green Manitoba project manager.

Time constraints also restricted the content, qualitative and quantitative analyses to be carried out on a small sample of 7 businesses. The businesses were chosen for their different types and sizes, which reflect the diversity of SMEs who participated in the Climate Actions project. The prospective business participants were also screened for their potential to demonstrate cultural change (e.g. transfer of EE knowledge to other premises). Provided the above criteria were satisfied, the businesses were then selected on a random basis to avoid research bias.

This research has a number of limitations due to the small sample size being sourced from only one project (owing to the time constraints). For a full set of 'universal' Indicators of Success to be uncovered and their weightings refined, further research involving a sizable number of businesses from a number of SME engagement projects using different approaches, is necessary. The quantitative analysis of a larger sample of businesses needs to be carried out to ensure that the individual Business Success Scores (for instigating certain EE changes) are statistically significant for an entire project. However, the full project dataset was used for the evaluation of the Target Business Index and the Business Action Index so that their values are indicative of the success of the Climate Actions project in engaging SMEs in EE measures.

1.5 Structure of the Dissertation

The reporting in this dissertation has the same sequential order as the research phases listed in the above Methodology Section:

Chapter 2 gives a summary of current research, and that of the 1990's, on the major barriers facing SMEs, and their incentives and motivation in becoming more energy efficient.

Chapter 3 lists a number of common approaches for engaging SMEs, accompanied by a brief description and their 'reported' effectiveness.

Chapter 4 gives an in-depth explanation of the rationale behind and the development of a set of Indicators of Success for an objective evaluation of the FWA. In Chapter 5, the effectiveness of the FWA was assessed using the developed Indicators of Success.

Chapter 6 is an analysis of the FWA to determine the major factors of success and possible future improvements. An exploration of the adaptation of the FWA to other sectors can be found in Chapter 7, while Chapter 8 is a summary of the research findings and conclusions.

Chapter 2 Barriers to Energy Efficiency facing SMEs

2.1 Introduction

There has been precious little research into energy efficiency (EE) for SMEs at a national level in Australia since the mid-1990s. This is due to a lack of government interest in this area in the last decade or so.

In 1996, the Productivity Commission produced a report which highlighted the impediments to energy efficiency in SMEs. The report resulted from a study undertaken by the (then) Bureau of Industry Economics which looked at the impediments to EE for SMEs, based on a database of energy audit data from participants in the Enterprise Energy Audit Program (Productivity Commission 1996). The report asserted that there is much larger potential for greenhouse gas (GHG) savings per unit of energy for smaller firms than for larger firms (by up to a factor of 5 times). However, there was no follow-up research or government program to assist SMEs in overcoming the impediments identified in the report. In fact, in its subsequent comments to the National Framework for Energy Efficiency Secretariat, the Productivity Commission cautioned against government assistance to SMEs on EE improvements, suggesting that the cost of intervention would not be justified by the small EE savings in this sector (Productivity Commission 2004).

The lack of government interest in improving energy efficiency in SMEs was reflected in the absence of any policy directed specifically to that area. The federally funded Greenhouse Challenge program, launched in 1995, was to target “all industry sectors”. It was largely successful in recruiting large to medium-sized organisations

who could implement energy efficiency measures with minimal support from a centralized office. However, the assistance to SMEs was left to Greenhouse Challenge partners to voluntarily ally with SMEs and help them develop action plans to improve EE, via the Greenhouse Allies program (AIC 2000). The lack of success of this policy was evident in the discontinuation of the Greenhouse Allies program while the Greenhouse Challenge program was extended to become the Greenhouse Challenge Plus program (DEHWA 2009a), which continued until July 2009.

In 2004, the Ministerial Council on Energy (MCE 2004) set up the National Framework for Energy Efficiency (NFEE), and a major policy on energy efficiency for businesses, targeted toward the top 250 companies, was launched as the Energy Efficiency Opportunities program in 2006. By contrast, EE research in and engagement with the SME sector was left to regional organisations in the last decade.

2.2 1990s Research Into Barriers Facing SMEs

The Productivity Commission report (1996) made an interesting finding: that "finance is not a major impediment to EE". Instead, the research identified a number of other barriers facing SMEs when considering EE proposals. For example, EE investments are viewed as being non-core, and therefore the proposals require short payback periods of the order of one or two years for them to be approved. The proposals also tend to get lost in bureaucratic processes within firms as they are pushed aside while more pressing core business gets prioritized attention. It was also noted that the in-house energy managers tend to be from middle management and lack the authority to act on EE opportunities identified through an energy audit.

The identified barriers in the abovementioned report mainly pertain to management decision-making processes, but do these apply to all SMEs? In order to answer this question, perhaps one needs to look at the definition of small to medium-sized enterprises. According to the Australian Bureau of Statistics (2001), there are three (3) categories of SMEs:

- Micro businesses which employ less than 5 people
- Other small businesses which employ more than 5 people but less than 20 people
- Medium-sized businesses which employ more than 20 people but less than 200 people

Whilst it would be feasible for a medium-sized SME of a certain size to have a hierarchical management structure, the multi-tiered management scenario may not apply to all small businesses, and certainly not to micro business.

It is important to bear in mind that the Productivity Commission (1996) report was based on three studies (two in Australia and one in the USA) which collated data collected from energy auditors and participants in energy audits. As small businesses tend not to commission energy audits due to the high cost to potential savings ratio, the studies' population was skewed toward the bigger SMEs. This is evident in the study data and comments in the report. According to the report, the majority of industrial electricity customers were not targeted in the studies as their energy savings potential did not warrant an energy audit. The "missing majority" referred to 10,000 small business electricity customers, out of 10,539 in NSW in the study period, which accounted for 40% of industrial electricity use. Whilst this does not invalidate the report findings, the relevance of some of the findings (such as cost not being a major barrier) as applied to small SMEs is questionable.

2.3 Current Research On Barriers Facing SMEs

In recent years, Australian research into energy efficiency in SMEs has been carried out on a more regional basis. Much of the research has been conducted outside of academia, with State government departments, local councils and chambers of commerce taking leading roles in research and program development. Some recent examples of the regional organisations which conducted research or developed programs targeting SMEs include the NSW Department of Environment, Climate Change and Water, Victorian Employer's Chamber of Commerce and Industry (VECCI), the Southern Metropolitan Regional Council (SMRC), the Swan Catchment Council, now Perth Region NRM (PRNRM), and the Moreland Energy Foundation.

As SMEs operate under similar (time and financial) constraints the world over, it is no surprise that the barriers identified in these independent research projects in Australia, and even those from the other side of the globe (Green Manitoba, Canada 2009), have significant overlap.

A recent survey conducted by the Victorian Employers' Chamber of Commerce and Industry (VECCI) identified cost and time as two of the most important barriers that prevent SMEs from taking energy actions (Grow Me The Money 2007). Research by Green Manitoba (2009) concurs with the VECCI findings, in that businesses perceive the cost of energy efficiency improvement as a major barrier. A study by the New South Wales Department of Environment, Climate Change and Water (DECCW) also identified cost as one of the major barriers (Instinct and Reason 2009). The higher upfront cost of EE products and services compared to their less efficient equivalents is a huge deterrent for small SMEs. Whilst their medium-sized counterparts are better

able to commit long term investment for an expensive upgrade or retrofit, small SMEs are unwilling, or unable, to take on near-term financial commitment for longer term benefits.

The lack of time to seek out or go shopping for energy efficient solutions and products is particularly crucial in the case of micro SMEs, with 5 or less employees (Jennings 2008). Some of the micro SMEs encountered in the Climate Actions project are husband and wife operations, whose opening hours far exceed normal business hours. They tend not to leave their premises except for pick-up and delivery for their core business.

The lack of awareness that SME owners have of their energy use also features in most of the research. This is backed up by the author's own experience in the role of Green Enterprise Facilitator for the Climate Actions project (2007-08) at the Southern Metropolitan Regional Council (SMRC). In fact, a number of business owners encountered did not check their electricity bills. A number of businesses simply paid the bill and lodged it with their accountant for tax returns and filing. In the author's opinion, and that of other practitioners (Favacho & Pekin 2008), there seemed to be little or no understanding of the relationship between energy use in the business and the size of the electricity bill in these cases.

Climate Actions participants also identified the lack of knowledge of where energy is used in the business as another impediment to taking action. Without the expertise to measure and analyse their energy consumption, many business owners simply did not

know where to start in making energy savings, and how to achieve them in a cost-effective manner.

In some cases, the energy efficient products or services are provided by only a few local specialist suppliers. This poses yet another hurdle for SMEs in taking energy actions. Without a list of suppliers, the business owners do not know where they can purchase suitable energy saving solutions for their particular situation. As SME owners may not have a high level of education, they often find it difficult to pick up public information, e.g. on the internet, by themselves. Therefore, extra assistance is necessary to help them make that leap to action.

In summary, the major barriers faced by SMEs identified in the literature research are:

- Cost (both the perceived and real cost of making EE improvement)
- Lack of time (and human) resources
- Lack of awareness of energy use
- Lack of EE knowledge and expertise, and
- Lack of access to local specialist suppliers

2.4 Other Challenges

Other challenges identified in the literature research (Green Manitoba 2009) were also confirmed by the Climate Actions project experience. These may apply to only some of the businesses, but they were often the factors determining the type of actions taken, or whether actions were taken at all.

Some business owners pay for their energy bills, along with their rent, to the shopping centre management, rather than directly to the utility. They are responsible for their own usage (often measured with sub-meters), as well as a proportionate part of the common usage (e.g. amenities and security lighting). In such cases, the owners do not receive the actual energy bill, and the connection between energy usage and cost is often hidden. As a result, they may not see any benefits from being more energy efficient.

Businesses who are leasing their premises are also reluctant to put in place "hard-wired" or "fixed" measures (Green Manitoba 2009 and Climate Actions experience). As leases are negotiated annually, or every three to five years, the businesses lack the incentive to implement measures with payback periods of more than a year, even though they can reap long-term benefits.

2.5 Incentives and Motivation for Better EE

The incentives and motivation for the SMEs to move toward better energy efficiency can be broadly grouped into two categories:

Environmental:

- Concern for the environment by the business owners is one of the motivators. Some of the Climate Actions businesses were already environmentally aware or were proactive in taking actions to reduce their impact environment. However, a majority did not 'see' the connection

between energy use and its impact on the environment[2]. Many business owners were interested in becoming more environmentally friendly through better energy efficiency, once the latter was explained to them.

- Media coverage on climate change had raised awareness in the issues of greenhouse gas emissions when Climate Actions was launched. This may have been partly responsible for the concerns many business owners had about climate change. They were keen to do their part in reducing GHG emissions through energy efficiency as a result.
- Business response to community expectations to "go green" was another incentive for the owners to reduce their environmental footprint (Grow Me The Money 2007), although this was not common among Climate Actions businesses.

Economic:

- The financial benefits of better energy efficiency were identified as one of the most important motivators for SMEs in a VECCI survey (Grow Me The Money 2007).
- Rising energy prices, and therefore costs, certainly helped to raise business awareness of the need to use less energy (SMRC 2008).
- The availability of financial incentives from the government also plays a part in motivating businesses toward taking EE actions (Instinct and Reason 2009).

[2] Recycling was 'seen' as an action which reduced their environmental footprint, but the impact of energy use on the environment was not a well accepted concept for most Climate Actions business owners (at the time of initial engagement).

Chapter 3 SME Engagement Approaches

3.1 Background

Different approaches have been used for engaging SMEs in energy efficiency measures in recent years. Some have met with more success than others. This chapter will provide a description of some of the most common approaches and their effectiveness. However, the latter is difficult to gauge as project reports vary in content, and media releases tend to be scant on information which indicate the effectiveness, or otherwise, of a project. It is fair to say that there are currently no 'universal' indicators of success which give an objective appraisal of the effectiveness of an engagement approach. Instead, project reports and anecdotal evidence are relied upon to provide some indication of the approach's success.

3.2 Seminar/Workshop Approach

The seminar/workshop approach has been used by a number of organisations to engage community groups, individuals and businesses in energy efficiency or environmental measures (Edith Cowan University 2008, Living Smart 2009). The target group is invited to attend a series of seminars or workshops at a designated location, often at weekly intervals for 4 or 5 weeks. The intended outcomes are to raise awareness and pass on useful information to assist the attendees in taking appropriate measures back home or at their business.

Whereas this approach has been quite successful in engaging individuals and community groups, it has had limited success in engaging SMEs. Energy efficiency

practitioners who have been involved in this approach reported low turnout rates from SMEs. The attendees tend to be already motivated, however, and are seeking more support from the practitioners. In some cases, there have been follow-up visits to the businesses for a walkthrough audit, and recommendations made in a report. However, there is no further contact with the business after that to assist them in taking actions.

The low turnout rate may be due to the fact that SMEs are so time and resource poor that they cannot afford to spend hours away from their premises to attend workshops. Anecdotal evidence, from practitioners who have been involved in such programs, suggests that these workshops tend to be attended by medium sized businesses that have a clear management structure. Micro and small businesses can neither spare the time nor the human resources to be present.

The actual effectiveness of this approach is difficult to gauge. The author has been involved in a follow-up walkthrough audit with one of the businesses which attended workshops, and requested further assistance. Despite receiving a report with a full list of recommendations, management did not take actions to improve energy efficiency.

3.3 Walkthrough Audit Approach (without facilitation)

Another common approach for SME engagement is the walkthrough audit approach. The business is offered a walkthrough audit of their premises to identify energy use areas and savings opportunities (DEWHA 2008). The audit can be performed by a government official or trained energy auditor. The auditor walks around the premises and makes a checklist of the major energy use appliances, and then ascertains the hours of operation with the owner. The business also fills in a questionnaire to provide

background information. The data is then processed (often at a central office), and a printed report is sent out to the business within a few weeks.

The disadvantage with this checklist audit approach is that the businesses do not feel that they are part of the process, as the walkthrough is carried out by the auditor alone. The professionally produced report often remains unread as the owner cannot find the time to do so, or they feel disinterested in the process.

The advantage of this approach is that the auditor comes to the business, and therefore allows the owner to stay on their premises. It is also a more personal approach than the seminar as it involves a face-to-face visit. The auditor has the opportunity to raise awareness of energy use with the individual business owner while on site. Some feedback from businesses on the informative value of the visit has been very positive.

However, there has also been some negative feedback from businesses who have been involved in these programs. Some of the report content has been known to be inaccurate and does not reflect what occurs in the business. Some of the recommendations in these reports also seem too generic and do not necessarily fit in with the existing business plan.

As there is no personal follow-up, the business owner has to be highly motivated to implement changes. They are also left with the onerous task of sourcing the right products and services to improve energy efficiency. Anecdotal evidence, gathered through private communication with practitioners, suggests that many businesses stop

at the first hurdle they come across when trying to make changes (Favacho & Pekin 2008).

3.4 Facilitative Walkthrough Approach

The Facilitative Walkthrough Approach (FWA) is an adaptation of the walkthrough approach. With the aim of engaging the businesses and assisting them along the journey to better energy efficiency, facilitation is the key component in the FWA. As the first point of contact, the facilitator engages the business and remains the key contact for the duration of the project.

Facilitation begins by having a conversation with the owner/manager. The walkthrough is conducted as part of the conversation, rather than a discrete process carried out by the auditor alone. Where possible, the owner/manager is invited along for walkthrough so that opportunities for energy savings are shared with them. They are encouraged to put forward their own ideas for better energy efficiency. The facilitator also provides assistance in filling out a short questionnaire for background information.

Instead of following the traditional audit procedure of data collection, analysis and reporting, the FWA does not produce a report for the business. By contrast, the time and human resources are spent on follow-up and facilitation. Multiple follow-ups are undertaken by telephone and face-to-face discussions after the initial visit, to assist the business in taking energy actions. The type and frequency of follow-up is provided on a needs basis.

In some cases, facilitation may entail finding suitable energy efficient products and services, arranging a site visit and/or a quotation from the supplier. During Phase 2 of the Climate Actions project (SMRC 2008), certain low-cost products were also made available to the businesses to purchase on site. In other cases, the facilitator may liaise with the landlord or local council to advocate on the business owner's behalf. In one case, the business was referred to a commercial auditor[3] for a more detailed assessment, at the owner's request.

The Climate Actions project also recognized the efforts of those businesses that have taken actions to improve energy efficiency. The top few businesses that took the most actions, or made the most savings, were invited to an award ceremony where they were presented with a certificate and gifts by their local councillors.

According to the SMRC report (2008), Climate Actions was very successful in recruiting participants. Over 75% of participants took actions to reduce their energy use at their businesses. A number of them also reported applying their energy knowledge and took actions at another business address and at home.

[3] Note that this did not come to fruition, as the commercial auditor was not so keen to present a quotation for his services. The rationale behind this is not clear, but perhaps the size of the business was rather small compared to his average client. A year on, there are now a few energy consultants who are working in the SME niche market.

3.5 Web-based Self-assessment Approach

With the widespread use of the internet, some organisations are using online packages as part of their programs to assist SMEs in becoming more energy efficient. Some of these programs also incorporate other approaches, such as audits and/or some facilitation.

A current project being run in Victoria provides a web-based toolkit to help SMEs perform self-assessment in the areas of energy, water and waste. They also provide some facilitation in the form of a case officer who gives advice specific to the businesses via the website (Grow Me The Money 2008). The basic concept is to encourage businesses to self-drive the process, by creating an online account, develop an action plan, perform a self-assessment and implement the action plan. It was reported that an earlier model had to be modified when the organisers realized that participants stopped making progress when they encountered a barrier. The program has since evolved from a generic approach to one which is more tailored. As a result, the recruitment and participation rates have apparently risen significantly according to their project report.

The program also includes an online sustainability forum where like-minded businesses can exchange ideas and learn from each other's experiences. It also recognizes achievement through a club award program which offers club branded marketing materials, publicity, invitations to networking events and financial incentives. Judging from the growing membership and participant testimonials, the program model seems to be a successful one.

Chapter 4 Development of Indicators of Success

4.1 Introduction

Over the years, there have been a number of different approaches used to engage SMEs in energy efficiency (EE) measures. Some of them have had more success than others. Yet, the effectiveness of each approach in bringing about changes has been almost impossible to evaluate. As each project report places different emphasis on the various, probably the most successful, components of the chosen approach, it is difficult for a third party, such as the funding organisation, to assess the project's effectiveness.

To complicate matters, the various approaches also have some overlap in strategies. For example, the facilitative walkthrough approach shares many elements with the traditional walkthrough approach. In its application, the 'web-based self-assessment' approach is not restricted to using a menu-driven computer interface. Some (online) facilitation, or even an on-site audit, is made available on request. Therefore, in order to measure the effectiveness of any approach, regardless of the strategies used, some common indicators of success need to be developed. These indicators can then be used to compare the approaches' effectiveness, as well as the success of individual projects. Funding organisations, whether they are from the public or private sector, would then be able to assess whether their money is well spent.

This chapter will explain the rationale behind the development of these common indicators of success and describe each indicator in some detail.

4.2 Rationale Behind the Development of Indicators

As the objectives for the development of indicators of success are evaluation and comparison between different approaches, the indicators have to be independent of methodology and timeframe to avoid bias toward any particular approach. At the same time, they need to be clearly defined so that there is no ambiguity in the way they are interpreted. The indicators of success also have to be meaningful and present a full picture of the effectiveness of the project or approach. Their evaluation has to be objective so that the assessor cannot cloud the results with their own opinions or bias.

In order to satisfy the non-bias criterion, the indicators have to be quantitative in nature. The reasoning behind this is that qualitative analysis, such as asking the participants whether they felt the project raised their awareness in energy efficiency is open to interpretation. In addition, the level of awareness is difficult to gauge merely by a rating system (e.g. pick 1 to 5 depending on how much more aware they feel), as this is a subjective measure and probably depends on how positive the participant feels on the day. By contrast, a quantitative indicator, such as actions taken and the proportion of energy saved through the actions, will be a good measure of whether awareness was raised.

For the indicators to be meaningful and representative of the success, or otherwise, of the approach, they must represent a range of key project performance. These include how successful the project was in:

- Instigating actions in the businesses
- Effecting behavioural change
- Effecting technology change

- Effecting cultural change

From the point of view of the funding organisations, it is also important to evaluate the project for its cost effectiveness, or "bang for buck". The indicators therefore also need to show how successful the project has been in:

- Recruiting participants
- Getting the EE message through to the audience
- Saving energy in the businesses

4.3 Content Analysis

Before any Indicators of Success (IOS) can be developed, a set of collected data from a case study (such as the Climate Actions project) has to be analysed to ascertain that it contains the information which allows for their measurement. Two data sources were used for this content analysis: the Business Participant Survey transcripts and the Climate Actions project data[4].

The Business Participant Survey[5] comprises a set of questions which set up the opportunity for a conversation with the participants about energy efficiency at their business, about one year after the completion of the project. The survey participants were randomly chosen, but the collection of businesses were screened so that they reflect the diversity of business types engaged in the project. They were also selected for their potential to transfer their newfound knowledge in energy efficiency to other

[4] Permission was obtained from the Climate Wise Team's Regional Greenhouse Coordinator to use the project data for this research (Zaman 2009).

[5] A sample Business Participant Questionnaire can be found in Appendix II.

arenas (or cultural change) and the ability to communicate[6] this to the author. In fact, the participants surveyed were forthcoming in talking about the actions they have taken after the completion of the Climate Actions project and dollar savings they have made in the business.

The Climate Actions project notes are summaries of the conversations between the business owner/manager and the Green Enterprise Facilitator (GEF), and the information gathered during the walkthrough audit. These two sources yielded information on the potential savings which can be made and the actions taken by the participants during the project.

Content analysis was performed on the Climate Actions records and the Business Participant Survey transcripts. The purpose was to ascertain the qualitative and quantitative information which can be gleaned from the conversations with the Climate Actions participants. This information transpired to be the actions taken by the participants to improve energy efficiency in their businesses.

The actions were sorted into the following categories:

1. Behavioural change – actions which require no change in technology, instead they are achieved through a change of work practice, or habit, to reduce energy wastage
2. Technology change – actions which require the application of new technology to conserve energy or use it more efficiently

[6] A number of the SME owners encountered in Climate Actions are recent migrants, who do not have a good command of the English language. As a consequence, it would have been difficult to conduct the Business Participant Survey and conversation with them, and obtain sufficient information for the research.

3. Cultural or attitude change – actions taken by participants of their own accord, beyond the scope of the project, e.g. actions taken at home or on other premises

Each action was then assessed to see if it could be used as evidence of some of the barriers to SME energy efficiency (identified in Chapter 2) having been addressed. The following criteria were used for the assessment:

- Can the action be attributed to an increase in awareness in energy efficiency?
- Was the action taken due to energy efficiency information being provided to the business, i.e. bridging the information gap?
- Was expert advice or assistance required to make the action possible, i.e. bridging the expert knowledge gap?
- Was the action made easier or possible by linking up the business with the suppliers, i.e. addressing the barrier of not knowing where to source EE products and services?
- Was the action made easier or possible by making an EE product available, i.e. addressing the time/resource-poor barrier by eliminating the need for the owner to leave the shop?

If the answer to any of the above questions was positive, then the action was deemed appropriate to be used as a component of the Indicators of Success.

4.4 Proposed Indicators of Success

Based on the criteria discussed in the previous section, a number of quantitative indicators of success are proposed. They are designed to give a measure of the effectiveness of the approach, in terms of reaching its target audience and effecting changes in its participants. The effectiveness of the approach to help SMEs make

energy, and therefore GHG, savings can also be measured. This could be a very useful tool for governments and other funding organisations to decide on the most appropriate approach to adopt for future projects.

The first five pertain to the actions taken, and can be good indicators of how successful the approach is for instigating changes in individual businesses, and the type of changes made:

- Behavioural Change Index (BCI) – a measure of the no-cost actions taken
- Low-cost Technology Change Index (LTCI) – a measure of the low-cost actions taken, e.g. timers on soft drinks refrigerators to turn them off overnight
- Medium-cost Technology Change Index (MTCI) – a measure of the actions taken which require moderate financial outlay by the business, e.g. installation of night blinds or plastic strip curtains on refrigerated open displays
- High-cost Technology Change Index (HTCI) – a measure of the actions taken which require substantial financial commitment by the business, e.g. major equipment upgrade, lighting retrofit
- Cultural Change Index (CCI) – a measure of future actions planned (for some time beyond the project timeframe), or actions taken by the participant outside of the business, such as at home, or on other premises. Only actual actions taken, as confirmed by a follow-up phone call perhaps a year after the project completion, would be counted toward the index score

The normalised sum of the above weighted indices is then calculated to give an overall Business Success Score (BSS) for each business being assessed. The score ranges from 0 to 100%, with a business not having made any changes scoring 0% to a business taking on board all the changes possible scoring 100%.

There are also three Project Success Indicators which pertain to the project performance:

- Target Business Index – a measure of the success of the recruitment strategies, e.g. general mailout, or using existing networks (through business associations) and connections (with local council officers)
- Business Actions Index – a measure of the success of the engagement strategies in getting the EE message through to the audience within the project timeframe, based on the percentage of businesses taking actions (the higher the percentage, the wider the audience reached)
- Energy Saving Index – a measure of the effectiveness of the approach in saving energy, based on the overall percentage energy savings of the participating businesses

The Project Success Indicators give a measure of the overall success of a project in achieving its aims to recruit and reach its audience, as well as to assist them in saving energy through better energy efficiency. They are independent of the approach and strategies used in achieving those aims.

4.5 Evaluating the Indicators of Success

Each Indicator of Success (IOS) is evaluated by summing and normalising the contributions from the energy actions taken. For example, if *n* actions contribute toward the Behaviour Change Index (BCI), then the formula used to calculate the BCI is as follows:

$$BCI = \Sigma a_n / n$$

where a_n *is the normalised factor pertaining to each action take, and* n *is the number of possible actions taken.*

$$a_n = \frac{\textit{(no. of a particular action)}}{\textit{(no. of such actions possible)}}$$

a_n *has a value of between 0 and 1. For example, if 2 appliances could be turned off overnight, but only one was manually turned off, then* a_n *is (1/2) or 0.5.*

The Business Success Score (BSS) is then calculated by assigning a weighting to each Index and summing them using the following formula:

$$BSS = \Sigma w_i \, IOS_i$$

where the w_i *is the weighting applied to the Indicator of Success,* IOS_i*, and* i *refers to the specific Indicator (BCI,LTCI, MTCI,HTCI, and CCI) which contributes toward the Business Success Score*

Table 4-1 below provides an example of how the Indicators of Success are calculated for a business:

Table 4-1 Example calculations of the Indicators of Success for a business

	Raw	NF*
Behavioural changes		
# of appliances decommissioned	1	0.50
# of lights turned off when not needed	0	0
# of appliances turned off overnight	24	1
# of appliances turned off when not in use	N/A	N/A
# of lights delamped	0	0
Adjusted A/C thermostat	N	0
Reduced hours of use for A/C	Y	1
Turn off standby power	N	0
Shift power use off-peak or tariff change	Y	1
Commenced recycling	Y	1
Average of above NFs (applicable ones only)		0.50
Overall BCI (weighting 10/100)		**5**
Low-cost Technology changes		
# of fridges on timers	0	0
Average of above NFs (applicable ones only)		0.00
Overall LTCI (weighting 15/100)		**0**
Medium-cost Technology changes		
# of plastic strip curtains installed	2	1
Average of above NFs (applicable ones only)		1.00
Overall MTCI (weighting 20/100)		**20**
High-cost Technology changes		
# of lights retrofitted	0	0
# of EE appliances to replace less EE ones	0	0
Average of above NFs (applicable ones only)		0
Overall HTCI (weighting 25/100)		**0**
Cultural/attitude changes		
# of actions taken at business after end of project	1	1
# of actions taken at home or other premises	0	0
# of EE actions planned in future	1	1
Average of above NFs (applicable ones only)		0.67
Overall CCI (weighting 30/100)		**20**

*NF = Normalised Factor

2 standalone appliances could have been decommissioned

Of the 2 timers which could have been installed on soft drinks refrigerators, none was installed

Using the set of weightings as shown in the table for each of the Indices, a total Business Success Score of 45% is obtained.

The Project Indicators of Success are percentages calculated using the following simple formulae:

$$TBI = \frac{(no.\ of\ participants\ recruited)}{(no.\ of\ participants\ approached)}$$

where TBI *is the Target Business Index which measure the whole of project success in engaging the targeted businesses*

$$BAI = \frac{(no.\ of\ participants\ taking\ actions)}{(no.\ of\ participants\ in\ project)}$$

where BAI *is the Business Actions Index which measures the whole of project success in instigating actions in the targeted business*

$$ESI = \frac{(total\ energy\ savings\ for\ all\ participants)}{(total\ energy\ use\ for\ whole\ project)}$$

where ESI *is the Energy Saving Index which measures the whole of project success in saving energy in the targeted businesses. It is the actual energy savings made by the project participants as a percentage of the total energy use by the same businesses before project engagement*

4.6 Sensitivity Testing of the BSS Indicators of Success Weighting

In order to ensure that the Business Success Score is representative of the real life picture of energy efficiency improvement, seven businesses from the Climate Actions project were scored and their rankings compared. Sensitivity testing was also performed on different weightings (chosen[7] to reflect the importance of the various IOS) to see if the relative ranking changed significantly. Figure 4-1 below shows the relative ranking of the 7 businesses, according to three different reasonable IOS weightings. The relative weightings of each of the five criteria are given in the legend for Figure 4-1.

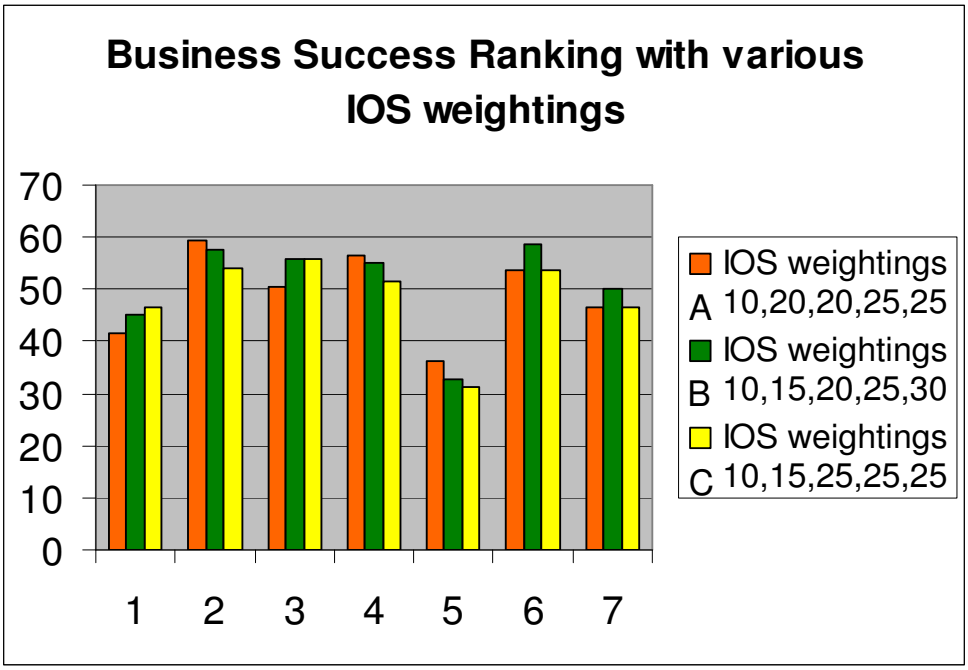


Figure 4-1 Sensitivity testing of the IOS weightings for the Business Success Score (the IOS weightings are listed in the order of BCI, LTCI, MTCI, HTCI and CCI, as defined in Section 4.4: Proposed Indicators of Success)

[7] Three sets of 'reasonable' weightings were chosen after consultation with the three experts who participated in the Expert Survey.

Table 4-2 Comparison of Business Success Score ranking using different IOS weightings

ID	Ranking by IOS weightings A (10,20,20,25,25)	Ranking by IOS weightings B (10,15,20,25,30)	Ranking by IOS weightings C (10,15,25,25,25)	Comments based on project experience
1	6 (42)	6 (45)	6 (47)	Made a number of technology changes within project timeframe
2	1 (59)	2 (58)	2 (54)	Best performer within and beyond project timeframe, cultural change is evident
3	4 (51)	3 (56)	1 (56)	Was already proactive in being environmentally friendly, and took some actions within project timeframe
4	2 (57)	4 (55)	4 (52)	One of the best performers within and beyond project timeframe in terms of making changes
5	7 (36)	7 (33)	7 (31)	Did not make as many changes as the other businesses in the survey
6	3 (54)	1 (59)	2 (54)	Not many actions taken within project timeframe, but made a number of high-cost technology changes after the project
7	5 (48)	5 (51)	5 (48)	Made some technology changes within project timeframe

Table 4-2 shows a comparison of the Business Success Score ranking of the seven businesses, using three slightly different sets of weightings for the Indicators of Success. In each set, the weighting for behaviour change is 10 as these changes may not be permanent (people tend to become less vigilant of energy use after a period of time). The weightings assigned to the other Indicators of Success differ in sets A, B and C.

Set A places equal emphasis on low-cost and medium-cost technology changes (20 each), and more emphasis on high-cost technology changes and cultural change (25 each). Set B places less emphasis on low-cost technology changes (15), much higher emphasis on cultural change (30) and increasing emphasis on medium- and high-cost

technology change (20 and 25 respectively). Set C place moderate emphasis on low-cost technology change (15), but equal emphasis on the other changes (25 each).

Perhaps the best way to measure the appropriateness of the weightings is to see how well the resultant BSS scores reflect the business performance. The best project performer responded most positively to all the suggestions from the GEF, by making behaviour and technology changes in the business during the project timeframe. There was also evidence of cultural change as she made further changes after completion of the project, both in the business and at home. Amongst the seven businesses surveyed, the business owner with ID 2 seemed the most proactive in taking actions in her business, and making energy conscious decisions in other arenas outside the business, such as at home. She is therefore regarded as the best project performer.

The ranking using weighting set A seems to most closely match project experience, as the best performer achieves top ranking. The businesses with the second and third ranking are also high achievers in energy efficiency improvement in their own right. The fourth ranking is attributed to the owner who was already engaged in environmentally friendly work practices (such as using recycled paper bags and compostable meat trays), although he was not knowledgeable in energy efficiency. However, his enthusiasm did not translate into many changes as he was contemplating retirement and selling up his business[8]. The fifth, sixth and seventh rankings are unchanged regardless of which set of weightings is used.

[8] This business owner has sold his business since the end of the project, and would be retiring within a week of the final interview with him for the research survey.

The ranking using weighting set B favours the business that made the highest cost technology changes and cultural change. The "best project performer" is ranked a close second, however, there is little differentiation between the third and fourth ranking (being the proactive business and one of the best performers respectively), with only one point difference in their BSS.

The ranking using weighting set C places the business that was already proactive first, and places the top project performer and the business that made the highest cost technology changes after the project at equal second. The business ranked fourth is one of the best performing businesses.

On balance, the weightings set A produces the results in ranking that seems to best reflect the reality of the business performance in improving energy efficiency.

4.7 Project Indicators of Success – Some Practical Issues

For the Project Indicators of Success to be regarded as universal, the data collection and analysis methods for the evaluation of these Indicators should be standardised. Careful design of the project data collection system and good record keeping throughout the project are also important to ensure that project analysis can be carried out with minimal effort.

The number of businesses who participated in a project and the number of businesses approached can be easily logged, and their ratio directly yields the Target Business Index. Follow-up is necessary to find out who took energy efficiency measures for the evaluation of the Business Actions Index. The fact-finding follow-up should occur on

completion of the project, and then again after twelve months. The latter allows for the actions taken beyond the project timeframe to be taken into account. These actions may have resulted from cultural/attitude changes, or may have required long-term business and financial planning to achieve.

Whilst the evaluation of the Target Business and Business Action Indices are relatively straightforward, there are some practical issues related to the evaluation of the Energy Savings Index. These are discussed in further details in the following subsections.

4.7.1 Potential Energy Savings versus Actual Savings

There is currently no standard protocol for reporting energy savings for a project. At least one 'award-winning' project reported their success based on potential savings rather than actual energy savings. The potential savings were based on the energy saving "opportunities" identified during the walkthrough. As no follow-up was made to ascertain whether the recommended actions were taken to capitalise on the said opportunities, it was impossible to evaluate how successful that project really was at reducing energy use.

In order to facilitate the comparison of like projects (with similar aims and target audiences), a standard reporting protocol based on actual energy savings should be established.

4.7.2 Quantification of Energy Savings

Project experience and feedback from other practitioners highlighted the difficulties in quantifying energy savings.

Ideally, the Energy Savings Index (ESI) should be based on actual energy savings, given as a percentage of the energy use before the business took energy efficiency measures. Twelve months of consumption data before and after project engagement would be preferable for the Index evaluation, to minimise the impact of seasonal variations on the Index. Yet, this data may not be easy or simple to collect.

Business owners and managers generally show little understanding of, or interest in, their utility bill. They tend to report their energy use, as well as savings, in dollar terms only[9]. Of the 91 businesses engaged in Climate Actions, not a single owner knew the kWh consumption at their business. To complicate matters, many of the business owners simply pay the utility bill and send off the original copy to their accountant for filing tax returns. In such instances, it would be impossible to calculate the energy use, unless permission is given to the project manager to access the business's energy bill data with the relevant utility.

So, in the absence of reliable and readily obtainable energy data, is there another way to quantify energy savings? Can an Energy Savings Index (ESI) which is based on percentage dollar savings be used instead?

[9] This is predictable as cost has been identified as a major driver for improving energy efficiency in SMEs.

There are a number of issues related to a dollar-based ESI. The savings and total energy cost figures are dependent on the energy tariff the business is on, as the unit cost of energy varies accordingly. Some of the businesses could also have made monetary savings from a tariff change (generally, from fixed rate to time-of-use[10] tariff), as well as from taking energy saving actions. In addition, tariffs may have changed during the survey period, thereby adding another unknown variable to the equation. An ESI evaluated in this way, therefore, cannot be regarded as a "primary" indicator of the project's success in reducing energy use in the businesses. At best, it can be regarded as a "secondary" indicator, and should be used with caution.

4.7.3 Unquantifiable Energy and GHG Savings

The energy and GHG savings that result from cultural change may not be quantifiable, although they may be substantial. A good indicator of a project which is successful in effecting long-term behaviour change is whether the participants make future decisions with energy efficiency in mind (which can be seen as evidence of cultural change).

Energy efficiency measures can be taken beyond the project timeframe, and outside of the business premises (e.g. at home or at another business). Whilst some of the actions, such as those taken within the first twelve months of project completion, will

[10] The time-of-use tariff charges a higher rate for electricity use from 8am to 10pm during the week, and a reduced rate overnight and at the weekend. For businesses with high off-peak power use, this type of tariff is highly favourable, and can make a significant impact on the electricity bills.

The behaviour change associated with tariff change is one of shifting power use to the off-peak periods, once the owner understands the monetary savings which can be achieved. Whilst this is beneficial for the utility (and in turn, the community) in reducing peak power consumption and lessening the chance of power blackout, there is little or no benefit to the environment in terms of GHG reduction from energy savings.

be accounted for, the energy and GHG savings of actions taken beyond the 12 month evaluation period or off the premises are not quantifiable.

Chapter 5 Effectiveness of the FWA

5.1 Introduction

The Facilitative Walkthrough Approach (FWA) is a hybrid approach for SME engagement which encompasses a traditional energy walkthrough audit, face-to-face conversations with the owner/manager, facilitation to assist actions being taken and follow-up visits or telephone calls. The approach was developed by Jennings (SMRC 2008) to target small businesses, particularly micro- (1-5 employees) and small-sized (less than 20 employees) businesses. It utilises specific strategies to overcome the major barriers facing SMEs engaged in making energy efficiency improvements. A Green Enterprise Facilitator (GEF) plays the pivotal role of engaging, facilitating and motivating the businesses throughout the project.

The Facilitative Walkthrough Approach (FWA) was employed by the Southern Metropolitan Regional Council (SMRC) to engage SMEs in energy efficiency measures in the Climate Actions project (2007-08). The project was reportedly very successful in assisting SMEs in improving energy efficiency at their business (SMRC 2008). This chapter examines the effectiveness of this approach, as implemented in the Climate Actions Project, and evaluates it using the Indicators of Success developed in the previous chapter. The project notes and report and a post-project survey of seven businesses were used as the main sources of data and information for this analysis.

5.2 Implementation of the FWA in Climate Actions

Figure 5-1 shows a schematic of the implementation of the Facilitative Walkthrough Approach in the Climate Actions project. A small project flyer and a 'With Compliments' slip from the Local Council were sent one week prior to the first

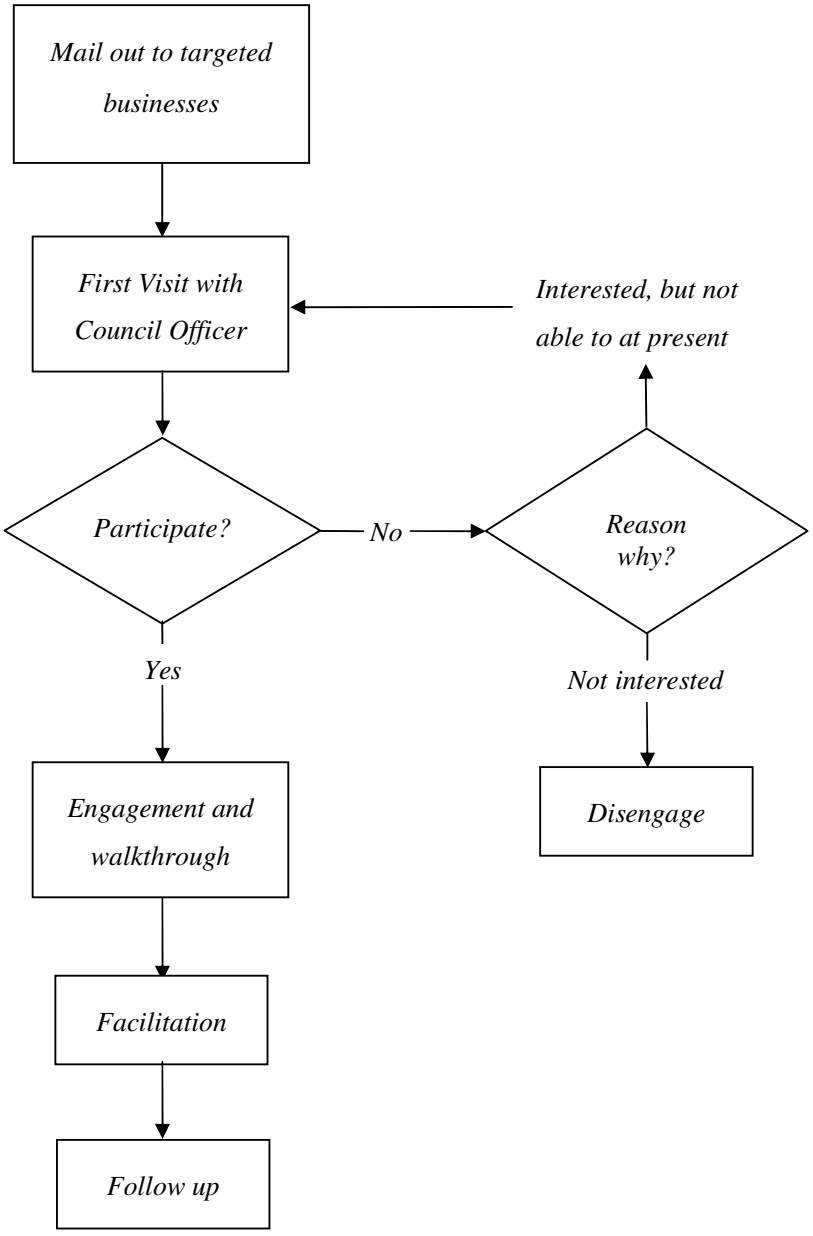


Figure 5-1 Schematics of the Facilitative Walkthrough Approach, as implemented in the Climate Actions Project (SMRC 2008)

on-site visit to the business. The Council slips were signed by the Cities for Climate Protection (CCP) Officer who may already be known to the business owner, through their official role, such as Environmental Health Officer.

The Green Enterprise Facilitator (GEF) then made the first visit to the business, accompanied by the CCP Officer, to invite the owner/manager to participate in the Climate Actions Project. If the owner/manager consented, then the engagement process began with the walkthrough energy audit and a dialogue with the owner regarding energy efficiency at the business.

Facilitation was an integral part of the engagement. As well as expert advice on how to save energy (or commence recycling), assistance was also offered to insulate the hot water pipe from the storage hot water system, or turn down the hot water thermostat setting. Where appropriate, the GEF also provided the owner with a list of suppliers and link to specialist suppliers. Some low-cost energy efficiency products were also brought to the businesses so they could be purchased on site (in Phase II of the project). Energy monitoring using a kilowatt-hour meter was also offered where the business owner was interested in measuring the potential savings which could be made by automatically turning off appliances overnight.

Follow-up telephone calls and visits were made after the initial visit, not only for facilitation, but also to keep energy efficiency on the agenda. The number of follow-up calls and visits varied according to the needs of the business for assistance. The owners were encouraged to call the Climate Wise Team if they required any assistance or energy advice.

5.3 Target Audience and the Barriers They Face

The Climate Actions project targeted around 97 small businesses in six local council areas in the Southern Metropolitan Region of Perth. These businesses were chosen for their relatively small size and potential for taking energy saving measures. They were mainly micro- to small-sized SMEs, particularly food premises with a reasonable amount of refrigeration needs. Table 5-1 shows a breakdown by type of the 91 business participants in the project.

Table 5-1 Summary of participating businesses

	Canning	***Cockburn***	***E Fremantle***	***Fremantle***	***Kwinana***	***Rockingham***	***Total***
Medium size Supermarket	*2*	*2*	*0*	*1*	*0*	*3*	***8***
Small Supermarket	*2*	*3*	*0*	*2*	*1*	*1*	***9***
Café	*1*	*3*	*2*	*3*	*0*	*1*	***10***
Deli/Lunch Bar	*6*	*9*	*1*	*4*	*4*	*5*	***29***
Butcher	*2*	*0*	*1*	*1*	*1*	*3*	***8***
F&V Store	*0*	*2*	*0*	*0*	*1*	*1*	***4***
Bakery	*0*	*1*	*0*	*0*	*1*	*2*	***4***
Liquor Store	*2*	*0*	*1*	*1*	*0*	*0*	***4***
Other	*1*	*3*	*1*	*5*	*1*	*4*	***15***
Total	***16***	***23***	***6***	***17***	***9***	***20***	***91***

(Source: Climate Actions Project Final Report, SMRC 2008)

The Climate Actions businesses are typical SMEs, in that all of the major barriers identified by the research (see Chapter 2) were reported by them:

- Cost of implementing energy efficiency changes. Cost is a real barrier for SMEs, as the upfront costs of certain technology changes, such as energy efficient upgrade of fixed refrigeration units, are prohibitive for very small businesses. Cost is also a perceived barrier, as many SME owners were not aware that there are no- and low-cost changes which are effective in reducing energy use, in addition to the high-cost measures.

- Lack of time (and human) resources to seek out the energy efficient products and services was a major issue for many of the smaller SMEs. This is also compounded by the lack of knowledge of what energy saving actions can be taken. For example, most businesses did not realise that installing timers on standalone soft drink refrigerators could reduce the appliance's energy use by up to 30%. However, even when this option was identified for them, most businesses did not take action until the timers were made available to them on the spot, and set up for them by the GEF.
- Lack of awareness of energy use in the business, as many of the owners did not "understand" or read the utility bill. A vast majority of owners did not relate energy use to the size of their energy bill, and therefore do not realise that they can reduce energy use, and save on cost.
- Lack of knowledge of where the energy was consumed, and where savings could be made, in the business was another major impediment, as the owners did not know they could take action, or direct their actions to areas of major energy use. Some of the businesses were very interested in having energy monitoring performed on some of their appliances, when offered the opportunity by the GEF. In fact, this often led to actions taken to reduce energy use. In other cases, the owners also benefited from the GEF making estimated calculations of energy savings from low-cost technology changes such as replacing incandescent light globes with compact fluorescent lights (CFLs)
- Lack of access to the suppliers for specialised products and services also posed as a major barrier. For example, there are not many local suppliers for industrial strength plastic strip curtains or specialists in energy efficient

lighting retrofits. Not only were the businesses unaware of the potential savings which could be made by taking the action, they had no idea where to look for the appropriate product(s) or service(s).

Consequently, the target businesses were found to be lacking in motivation at the beginning of the engagement process, as energy efficiency had never been part of their agenda.

5.4 Measurable Project Outcomes

Feedback from the Climate Actions participants (SMRC 2008), suggested that the FWA strategies were successful in assisting project participants in overcoming the major barriers facing them. However, anecdotal evidence, such as feedback and comments from participants, are not sufficient to prove the effectiveness of a project, or an approach. An objective appraisal is needed to measure the success of the project, and the FWA, in improving SME energy efficiency. Qualitative and quantitative analyses of the project outcomes were carried out to achieve this aim.

5.4.1 Qualitative Analysis – Business Participant Survey

Seven Climate Actions businesses took part in the Business Participant Survey twelve months after the completion of the project. The survey was designed to gauge their opinions on whether the Climate Actions project was successful in assisting them achieve better energy efficiency. The survey was conducted in an open conversational manner to encourage the participants to volunteer other information, such as energy saving actions they may have taken after the project, or in other arenas of their lives.

Their responses to the questionnaire, and the conversation transcripts with the researcher, were analysed qualitatively to look for evidence of the effectiveness of the FWA.

Table 5-2 below is a summary of the results from the business survey and the extra information proffered by the respondents during the interviews.

Table 5-2 Summary of business participant survey

	Respondent ID No.						
	1	*2*	*3*	*4*	*5*	*6*	*7*
Barriers identified by the respondents:							
– *Lack of awareness*	✓	✓	✓	✓	✓	✓	
– *Lack of knowledge*	✓	✓		✓	✓	✓	
– *Lack of specialist access*	✓	✓	✓	✓	✓	✓	✓
– *Cost*	✓		✓		✓	✓	✓
– *Energy efficiency not on the agenda*		✓	✓	✓	✓	✓	
The energy walkthrough audit was useful in:							
– *Discovering where energy is used*	✓	✓	✓	✓	✓	✓	✓
– *Identifying areas of major energy use*	✓	✓	✓	✓	✓	✓	✓
– *Getting energy saving ideas*	✓	✓	✓	✓	✓	✓	✓
Face-to-face conversations were useful in:							
– *Raising awareness in energy use*	✓	✓	✓	✓	✓	✓	✓
– *Getting expert advice*	✓	✓	✓	✓	✓	✓	✓
– *Bringing out their own ideas*	✓	✓	✓	✓	✓	✓	✓
– *Getting motivated*	✓	✓	✓	✓	✓	✓	✓
Participation in Climate Actions helped them:							
– *Become more aware of energy use*	✓	✓	✓	✓	✓	✓	✓
– *Take actions to save energy*	✓	✓	✓	✓	✓	✓	✓
– *Realise some of their own EE ideas*	✓	✓	✓	✓	✓	✓	✓
– *Find energy efficient products & services*	✓	✓	✓	✓	✓	✓	✓

Table 5-2 Summary of business participant survey (cont'd)

Other information volunteered by the respondents can be categorised as follows:

Outcomes of actions taken:
- *The shop does not get so hot overnight now that the soft drink fridges are turned off overnight with timers, so the air conditioning is used more efficiently*
- *Lower energy bills*

Further actions taken in the business at the owner's initiative (after Climate Actions):
- *Have started turning half the lights off during the day*
- *Now turning off soft drink refrigerators even earlier*
- *Decommissioned more refrigerators*
- *Decided to delamp[11] the double fluorescent light fittings*
- *Replaced old fluorescent tubes with higher efficiency equivalents*
- *Undertook major lighting retrofit – replaced 180 standard fluorescent tubes with 130 high efficiency ones*
- *Have increased the refrigerated display areas by 30%, and put in 13 enclosed freezers to replace one large open-chest freezer, but the utility bill has remained the same because more energy efficient systems have been installed*

Future intended actions:
- *Night blinds will be installed on new refrigerated displays when finances allow*

Energy efficiency knowledge transferred to other arenas:
- *Have installed timers on soft drink refrigerators at another shop*
- *Have started being more energy efficient at home*

Qualitative analysis of the survey suggested that the FWA strategies used in the Climate Actions project were effective in breaking down the many barriers facing the SMEs. The additional information volunteered by the respondents showed that not only were the respondents aware of the positive outcomes of their actions, they had also taken actions to further reduce energy use of their own accord. There was also evidence of the transfer of their newfound energy efficiency knowledge to their homes and to other businesses under their management. This was sure sign of a cultural or attitude change in the participants, in that they had begun to make future decisions with energy efficiency in mind.

[11] Delamping refers to the removal of one of the two fluorescent tubes from a standard double fitting (commonly found on commercial premises). The energy savings are typically less than 50% of the running cost of the lighting, as the ballasts are left in place.

5.4.2 Quantitative Analysis – Business & Project Success Indicators

The effectiveness of the FWA in instigating actions was also assessed through a quantitative analysis, based on the actions taken by the seven surveyed businesses during, and up to 12 months after, the Climate Actions project. This was achieved by evaluating the Business Success Indicators, developed in Chapter 4, and obtaining a Business Success Score for each individual business. The success of the Climate Actions project in engaging and reaching the target audience, and helping them save energy was, in turn, assessed by evaluating the Project Success Indicators.

Figure 5-2 Business Success Scores for the surveyed businesses

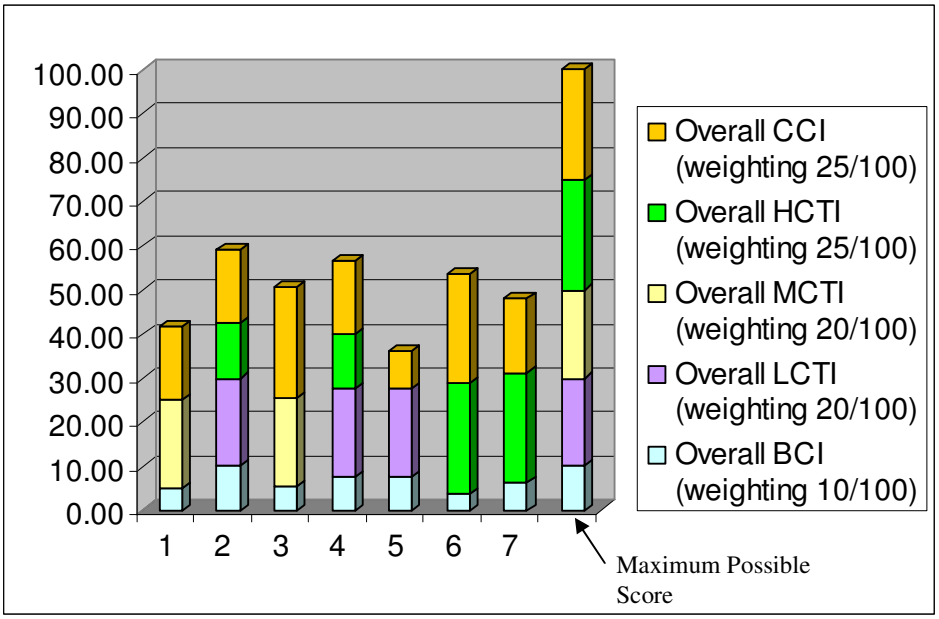


Figure 5-2 shows the Business Success Scores (BSS) for the seven surveyed businesses. The BSS were scored according to the criteria and action categories defined in Chapter 4. The results showed that:

- The highest scoring business has a BSS of 59%, the lowest one scored 33%. The highest scorer, respondent #2, is one of the project's best performers, in that the owner was very receptive to the EE message, and took many

actions, from behavioural to low-cost, and high-cost, technology changes. The owners intend to implement a medium-cost technology change (by installing plastic strip curtains on the cool room entrance) when finances allow. Their score would have been 79% had they implemented the medium-cost change by the time of the survey. They also showed cultural change by taking energy saving actions beyond the project timeframe, and transferring EE knowledge to their home.

- All the businesses made behavioural changes to reduce energy use, to various extents.
- A majority (5 out of 7) of the businesses made low-cost and/or medium-cost technology changes. Of the two respondents who did not make these changes, respondent #6 was a medium-sized SME with large energy bills[12] whose owner was environmentally aware, but had no idea about energy efficiency when first engaged by Climate Actions. Although he did not make any technology changes during the project, he made the conscious decision to make energy efficiency gains[13] while implementing his planned refrigeration expansion[14] and performing a whole-of-shop lighting retrofit[15]. Respondent #7 was one of the most energy aware participants of the project. He was already manually turning off his soft drink refrigerators at the end of the business day when first approached by Climate Actions. However, he

[12] The electricity bill alone was reported to be approximately $80,000 per annum.
[13] The energy efficiency gains were made through higher efficiency equipment upgrade and lighting retrofit. Unfortunately, the combined savings from those actions are hidden as there was a simultaneous increase in energy requirements. The owner reported no change to his energy bills since the expansion and upgrade.
[14] The owner expanded the refrigerated display area by 30%, but the new energy efficient refrigeration systems are 25% more efficient than the old units, and replaced a large open-top freezer with 13 upright display freezers with glass doors.
[15] The lighting retrofit in this case involved the replacement of 180 standard (T8) fluorescent tubes, with 130 high efficiency (T5) fluorescent tubes. Calculated savings in lighting energy use = [(180*42W) – (130*28W)] / (180*42W) = 52%.

was receptive to more EE suggestions and upgraded his large gas storage hot water system to a 6-star rated gas instantaneous one. When he was linked up to the specialist lighting supplier, he also took the opportunity to retrofit the front of his shop with higher efficiency lighting[16], as part of a planned renovation.

- More than 50% (4 out of 7) of the businesses made high-cost technology changes. Lighting retrofit and equipment upgrade were the two categories of high-cost actions taken.
- All the businesses made cultural or attitude changes, i.e. they took more energy saving actions on their own initiative after the project, and/or they transferred energy efficiency knowledge and ideas to other arenas in their lives.

Although the Business Success Scores for the surveyed businesses were not that high (ranging from 33% to 59%), the Indicators of Success showed that all of the businesses made behavioural and technology changes to save energy. More importantly, the results showed that all of them made cultural changes, which have energy and GHG emission saving implications well beyond the scope of the original project.

Table 5-3 shows a summary of the Project Success Indicators: the Target Business Index (TBI), Business Action Index (BAI) and Energy Savings Index (ESI) for the Climate Actions project. The TBI and BAI were evaluated using the formulae specified in Chapter 4.

[16] Double fittings of standard fluorescent tubes, with magnetic ballasts, were replaced with single fittings of triphosphor tubes, electronic ballasts, and a specular reflector.

Table 5-3 Project Success Indicators for Climate Actions

Project Success Indicator	*Percentage Score*
Target Business Index	*94%*
Business Action Index	*76%*
Energy Savings Index[17]	*20%*

The ESI was estimated using the energy bills and cost savings, from actions taken during, and within 12 months of the completion of, the project, as reported by the seven survey participants. The reason behind this was that the relevant energy data were not available. For the evaluation of the ESI to be based on energy use, the energy bills showing usage for the 12 months prior to the project engagement, and 12 months after the completion of the project would have to be collected. However, this posed a problem for the participants as at least one of them does not receive an energy bill directly from the utility (instead, he pays the Centre Management for the energy used in his shop as well as a share of the bill for the common areas), and some of them cannot easily access their bills, as they are filed with their accountant. Because of these uncertainties, as discussed in Section 4.7.1, the resultant ESI can only be regarded as a secondary Indicator of Success.

The TBI of 94% and BAI of 76%, based on the whole of project statistics, are evidence of the effectiveness of the Climate Actions project in engaging the target businesses, and instigating changes. The ESI of 20% has to be treated with some caution, but can be used as a rough indicator of the project's success in assisting the surveyed businesses in saving energy.

[17] The Energy Saving Index was calculated using the sum of the reported energy cost savings, as a percentage ratio of the total energy costs for the seven surveyed businesses. Ideally, the energy use (in kWh) of all the project participants recorded before and 12 months after the project should be used for the evaluation of the ESI. Unfortunately, this data was not collected as part of the Climate Actions project.

5.5 Discussion

5.5.1 Different Attitudes and Priorities

Project experience and the qualitative survey results suggest that micro- and small-sized SMEs have different attitudes and priorities compared to their medium-sized counterparts, when it comes to energy efficiency improvements. The smaller scale SMEs are more concerned about the initial outlay, probably due to tighter budgets and restricted capacity to borrow. They are therefore less likely to commit to high-cost technology changes. Instead, they readily take up efficiency measures which have instant payback (i.e. behaviour changes) or short payback periods (low- to medium-cost technology changes). This is evident in the business participant survey, in which five out of six of the micro SMEs in the survey made these no- or low-medium cost technology changes, but only one out of the six micros made all of the high-cost technology changes identified.

By contrast, medium-sized SMEs (such as respondent #6) look upon the no-, low- to medium-cost actions as having too small an impact on energy saving to be worth their effort. They are more likely to make high-cost technology changes, such as whole-of-shop refrigeration upgrade and lighting retrofit. The author's recent project experience involving medium-sized SMEs suggests that more convincing evidence, such as a detailed energy audit, is often required before the owner or management would commit to taking actions.

In view of these observations, perhaps the highest Business Success Score to be expected of an SME is of the order of 75% to 80%, using the existing weighting

system (see maximum possible score in Figure 5-2). A business that scores higher than that would have to make changes in every way, assuming the opportunities exist to take actions in all the categories, from behaviour, to low-cost, medium-cost, high-cost technology to cultural changes. For at least one of the micro businesses surveyed, his early awareness in energy use actually meant that he had already taken some no-cost actions (such as turning off the soft drink refrigerators manually). So his score was actually lower than it would otherwise be if he had not been so aware in the first place.

5.5.2 Unaddressed Cost Barrier

Whilst it seems that most of the major barriers facing SMEs were tackled successfully through the FWA, the "real" (as opposed to the "perceived") cost barrier was not addressed in any substantial way. The Climate Actions project was sponsored by a local lighting supplier who gave an almost 50% discount on energy savers[18] for 12V halogen downlights. These proved to be very popular among project participants when they were made available to them on site. Through this partnership with the lighting supplier, the cost barrier of one energy efficient product was temporarily addressed. In the long term, however, the cost barrier is not likely to be easily addressed unless EE products receive government subsidies, or their production costs fall due to economies of scale, as demand grows.

[18] The energy savers have a recommended retail price of more than 5 times that of a standard downlight. Even with 30% potential energy savings, and twice the lamp life, the businesses were not keen to take up the measure due to payback periods of over a year. With the discount offer, however, most of the businesses did not need much convincing to take action as the payback period of approximately six months was found to be acceptable.

5.6 Other Factors Influencing the Project Outcomes

Other factors which may have influenced the project outcomes are related to planning and engagement strategies, rather than to the FWA.

In the case of Climate Actions, the project developer chose to target a specific group of businesses (food premises) who shared many common energy appliances, eg. refrigeration, lighting and cooking equipment. This kept the time taken to research and source specialist equipment to a manageable amount, and allowed the facilitator more contact time with the business owners.

Existing network and connections through the local councils were exploited when first contact was made with the businesses. The introduction of the GEF by the Council Officer lent certain legitimacy to the project, and may have accounted for the high participation rate.

5.7 Key Research Findings

This research found that the FWA, as implemented in the Climate Actions project, was successful in assisting the surveyed SMEs in improving energy efficiency. Through qualitative and quantitative analyses, it was shown that the FWA strategies of walkthrough audit, face-to-face conversations, facilitation and follow-up, were successful in overcoming the major barriers facing SMEs.

Results from the qualitative analysis show that the Climate Actions SMEs are typical in that they face the same barriers as those found in previous research. These barriers

include cost, lack of time (and human) resources, lack of awareness and knowledge of energy matters, and the lack of access to specialist suppliers. All these led to a lack of motivation at the beginning of the engagement process.

Seven businesses were surveyed twelve months after the completion of the Climate Actions project. The qualitative analysis of the survey results showed that the FWA was very successful in assisting them to overcome the barriers to energy efficiency.

Quantitative analysis was carried out by evaluating the Indicators of Success developed in Chapter 4. Results from the quantitative analysis showed that all the businesses made behavioural, technology and cultural changes. The survey's best performer had a Business Success Score (BSS) of 59%, while the worst performer scored 33%. While all the businesses made some behavioural changes, a majority of them made low-cost and/or medium-cost changes. One medium-sized respondent made many high-cost changes, including EE refrigeration upgrade and lighting retrofit.

The Climate Actions project had an excellent Target Business Index (TBI) of 94% and a very good Business Action Index (BAI) of 76%. These are indicative of the project's success in reaching its target audience and instigating actions. The evaluation of the Energy Savings Index (ESI), based on energy use savings, proved to be problematic. Due to difficulties in gathering the energy use data, the ESI was evaluated using reported energy cost savings, as a percentage of overall annual spend. Therefore the ESI score of 20% should be treated as a secondary Indicator of Success.

The research also showed that different sized SMEs have different attitudes and priorities. Medium-sized SMEs are more likely to make high-cost technology changes, but are less likely to take no- and low-cost actions. Micro and small SMEs, on the other hand, are more likely to make behavioural and low- or medium-cost technology changes. In view of these observations, the highest Business Success Score to be expected of an SME would be of the order of 75% to 80%, using the existing weighting system.

While the perceived cost barrier was overcome by the FWA, the real cost barrier was not addressed in any substantial way. Through partnership with a local lighting supplier, Climate Actions was able to temporarily address the cost barrier of one EE product. However, the cost barrier cannot be easily addressed unless EE products receive government subsidies, or their production costs fall due to economies of scale, as demand grows.

Chapter 6 Major Factors of Success & Future Improvements

6.1 Introduction

There have been various approaches used to engage SMEs in energy efficiency measures. Some of them had better success than others in instigating EE actions. Qualitative and quantitative analyses (Chapter 5) have shown that the Facilitative Walkthrough Approach (FWA) and the Climate Actions Project (SMRC 2008) were successful in assisting the surveyed SMEs in reducing energy use in their businesses. More importantly, the FWA seemed to have been very effective in instigating cultural changes, which can have far reaching consequences beyond improving energy efficiency in the participating businesses.

This chapter will examine the major factors of success of the FWA and explore the possibility of future improvements which can be made.

6.2 Success of FWA Strategies in Overcoming Barriers

The FWA is a hybrid approach for engaging SMEs, with a number of strategies which coincide with other projects. In light of the relative success of the FWA in the Climate Actions project, a closer look at how the specific strategies are targeted toward breaking down barriers for the SMEs is warranted.

Four major strategies (as summarised in Table 6-1) were employed to assist the project participants in overcoming the barriers they face in improving energy efficiency.

Table 6-1 FWA strategies targeting barriers facing SMEs

Strategy/Barrier	*Perceived Cost of EE measures*	*Lack of Time*	*Lack of Awareness*	*Lack of Knowledge*	*Lack of Specialist Access*	*Lack of motivation*
Walkthrough			✓	✓		✓
Face-to-face conversations	✓	✓	✓	✓		✓
Facilitation		✓			✓	✓
Follow-up						✓

6.2.1 Walkthrough Energy Audit

Businesses who were surveyed (see Qualitative Analysis in Chapter 5) reported that their awareness of energy use was raised by the walkthrough audit. A number of the business owners confessed that they had no idea where most of the energy was used in the shop, or where savings could be made, prior to the walkthrough audit. Most of them were surprised when told that there were many no- and low-cost energy efficiency solutions available. This strategy was necessary to dispel the myth that "energy efficiency costs money" and the responsibility should be left to the "big end of town".

Energy monitoring of some of the single phase appliances was also offered. At a number of businesses where there were standalone soft drink refrigerators, energy monitoring using a kilowatt meter was used to demonstrate the potential savings from the installation of a timer to turn them off automatically overnight. In every instance, the owner became more motivated to implement that measure after they were shown the energy savings calculations, based on the energy monitoring results.

6.2.2 Face-to-face Conversations

The FWA used a personalised approach when engaging the businesses. Although the initial invitation was sent by mail, each business was paid a personal visit from the facilitator (and the Council officer) within a week of receipt of the mail-out. The facilitator was then able to engage the owner/manager in a conversation and explain the aims of the project and how the business could benefit from it (savings in energy use and cost). By holding the conversation on the premises, the owner felt less time pressure as they did not have to leave the shop (e.g. to attend a workshop), and the discussion about energy use at the business was also seen in context.

The face-to-face conversations with the Climate Actions businesses were very well received. The owners/managers appreciated the "tailored" advice and assistance provided to the individual business, rather than general information (e.g. from information leaflets or brochures). As well as raising the level of awareness and knowledge of energy use, the owners also received positive feedback for any actions they may have taken (no matter how trivial), and assistance to realise ideas they may have to save energy. As a result, the owners became motivated to take actions to further improve energy efficiency, by adopting some of the suggested measures.

6.2.3 Facilitation

Facilitation was seen as one of the most important strategies in instigating technology changes in the businesses. Many of the smaller business owners could not afford the time to shop for energy efficient products. This was particularly evident in the case of purchasing timers for their standalone soft drink refrigerators. Even though the low-

cost[19] timers were readily available from the local hardware store, only one business owner made the purchase following the initial visit (in which the suggestion was made). All the other businesses, who were interested in the potential savings, did not take any action until the Facilitator made the timers available to them on site. This was even more pronounced in the case of specialised products and services, such as plastic curtains for open-front refrigerated display and lighting retrofit. After conducting her own research into the products and local suppliers, the Facilitator was able to provide the businesses with a list of the specialist suppliers.

In most cases, the Facilitator had to link up the business with the suppliers by making the telephone call to arrange the site visit and quotation to overcome the initial lack of motivation. This was a successful strategy though, as the businesses then followed through with the purchasing of the EE products and services in a majority of cases.

6.2.4 Follow-up

Follow-up, via telephone calls and/or further visits, was another important FWA strategy. Over a period of months, a good working relationship between the Facilitator and the owner gradually formed. With every positive action, the owner could see that that the Facilitator was working with them toward reducing their energy costs. This ongoing support, or "handholding" as referred to by another practitioner (Favacho 2009), played a vital role in keeping energy efficiency on the agenda, and ensuring the owner remained motivated.

[19] A sample of the 24-hour timers, which cost less than $10 for a pack of two, was shown to the business owner during the visit.

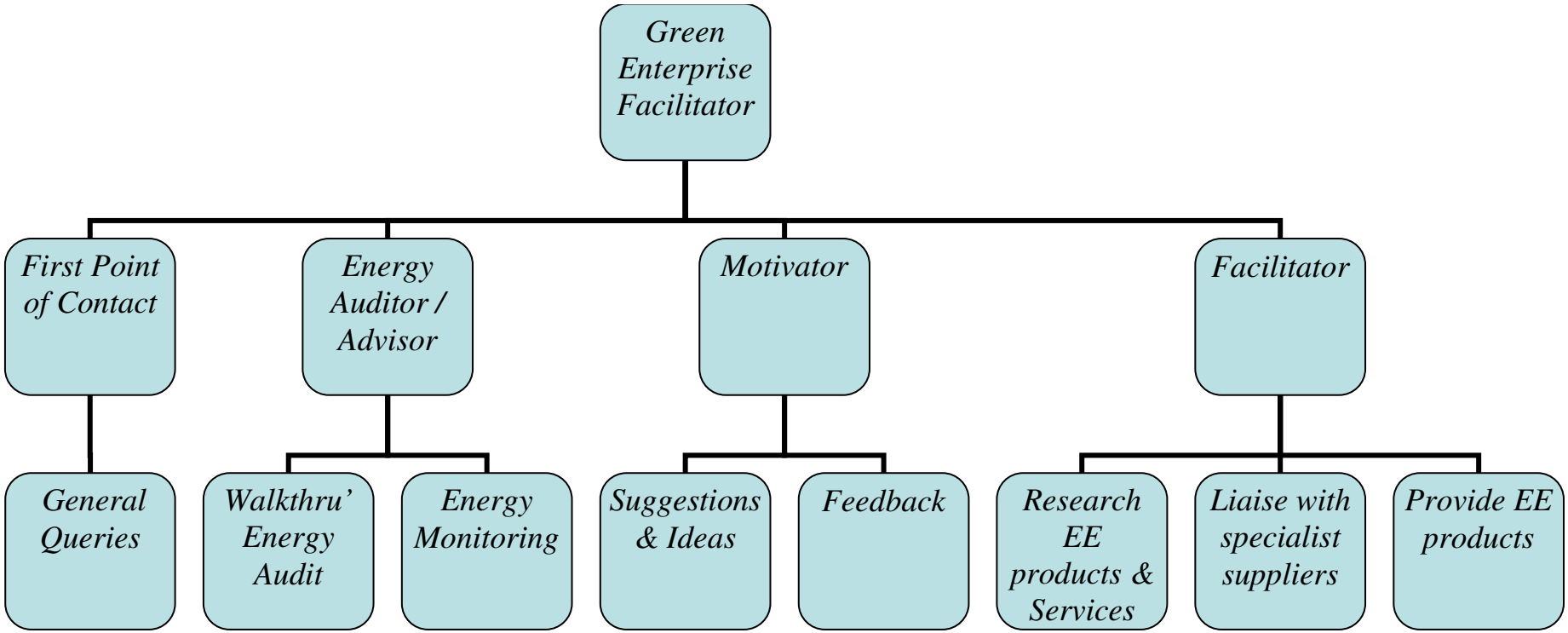
6.3 The Important Role of Facilitation

The developer of the FWA and the Climate Actions project manager believe that facilitation plays a crucial role in the success of the FWA (Jennings 2008, Zaman 2009), and that the relationship between the Facilitator and the business owner is central to this success.

In Climate Actions, the Green Enterprise Facilitator (GEF) has multiple roles, being: the first point of contact, energy auditor/advisor, motivator, and facilitator. These roles are illustrated in Figure 6-1.

The GEF is the first point of contact for the business. If the business has any queries regarding the project, they are encouraged to call the GEF by telephone. As well as being an energy professional who conducts the walkthrough audit and energy monitoring, the GEF is also the motivator. During the dialogue with the business owner, s/he encourages them to put forward their own ideas for energy savings. Sometimes, this has led to changes in work practices which the owner had been thinking of, but not implemented until prompted by the GEF. S/he also gives ideas and suggestions to the business on the most cost-effective actions which can be taken. S/he motivates the businesses by giving positive feedback on any actions they may have taken.

Figure 6-1 The multiple roles played by the Green Enterprise Facilitator in Climate Actions



In the role of the "facilitator", the GEF conducts research on EE products and services, and compiles a list of local suppliers. Where necessary, s/he also liaises with the businesses and the specialist suppliers to request a site visit and quotation. During Climate Actions, two low-cost products[20] were pre-purchased and brought along to the business visits for on-selling (at cost) to the businesses. This proved to be a particularly successful strategy in instigating low-cost technology changes. Sometimes, s/he also advocates on the business' behalf, for example, for the provision of a Council recycling bin.

The importance of facilitation in instigating technology changes can be seen in an analysis of the actions taken by the survey participants. Table 6-2 below is a matrix of some of the major FWA strategies (columns) versus the actions taken (rows). The cross-over cell is populated with the '♦' symbol where an action has resulted from applying those FWA strategies, in conjunction with the traditional Energy Walkthrough Audit (EWA) strategies.

It can be seen in the matrix that behavioural changes were predominantly instigated through the raising of awareness, provision of EE information and expert advice. These were accomplished through the traditional EWA strategies of walkthrough audit and face-to-face conversations.

The matrix shows that there is a correlation between facilitation and technology change (purple cells). For every technology change made, facilitation was required,

[20] Standard 24-hour timers and energy savers for 12V downlights were the two products made available to the businesses. They were chosen as many businesses were interested in the technologies but the GEF found that only one business acted on the advice to install them during Phase I of the project. When they were provided on-site in Phase II of Climate Actions, the products were readily taken up by all the businesses who had the opportunity to take advantage of them.

regardless of whether they are low-cost, medium-cost or high-cost. In the case of the (low-cost) timers, the GEF had to pre-purchase them and on-sell them to the businesses, even though they were available at most hardware stores. The owners simply did not have the time to leave their shop and make the purchase themselves. In the case of the (medium-cost) plastic curtains, and (high-cost) lighting retrofit, the GEF had to link them up with the suppliers, by making the telephone request for a site-visit and quotation.

	EWA STRATEGIES			FWA STRATEGY	
	Walkthrough Audit & Face-to-face Conversation			Facilitation	
Actions Taken	Raised awareness	Provided EE Information	Provided expert advice	Linked up with suppliers	Made available EE products
Behavioural changes					
Appliances decommissioned	♦	♦	♦		
Lights turned off when not needed	♦	♦	♦		
Appliances turned off overnight					
Appliances turned off when not in use	♦	♦	♦		
Lights delamped	♦	♦	♦		
Adjusted A/C thermostat	♦	♦	♦		
Reduced hours of use for A/C	♦	♦	♦		
Turn off standby power	♦	♦	♦		
Tariff change (shift power use off peak)	♦	♦	♦	♦	
Commenced recycling	♦	♦	♦	♦	
Low-cost Technology changes					
Installed timers on refrigerators	♦	♦	♦		♦
Medium-cost Technology changes					
Installed plastic strip curtains	♦	♦	♦	♦	
High-cost Technology changes					
Lighting retrofit	♦	♦	♦	♦	
Energy efficient upgrade	♦	♦	♦	♦	

Table 6-2 Correlation between the actions and strategies used in the Climate Actions project (The ♦ symbol in the cell denotes that the action, shown in the row, was taken as a result of applying those EWA and FWA strategies, shown in the columns)

It is also interesting to note that some of the behavioural changes also required some facilitation. These changes (tariff change and commencement of recycling) require time and effort on the part of the business to organise, as opposed to the other actions in this category which can either be performed easily or incorporated into part of the daily routine. In the case of tariff change, the GEF organised the owner's request for the tariff change and/or change-over to another energy company, by assisting with the completion of the application form or writing the acceptance letter. For recycling, the GEF may have to liaise with the local Council to organise the delivery of a recycling bin, or make a request to a commercial recycling company for a quotation. Even though the owners were keen to make the change in these cases, they did not take action without the facilitation.

6.4 Relationship Building and Cultural Change

The building of a good working relationship with the business owner/manager was an important part of the engagement process. Personal engagement with the owner and the provision of tailored, relevant advice not only overcame the time barrier, they also made the owner feel valued. Their expertise at running their own business was recognised, and the GEF did not show up with a 'bag of standard solutions'. With the GEF's persistence, even the less-motivated owners slowly took actions to improve energy efficiency at their shops.

Over a period of many months, the owner came to see some of the positive outcomes of their EE actions, such as a 'cooler' shop[21], and a reduced energy bill. As they came to realize some of the benefits of their actions, their trust in the GEF gradually developed. They then began to re-align their own attitudes with the GEF's toward energy efficiency.

Many of the owners became self-motivated, and began to make EE changes in the shop, and in other areas of their lives, without further prompting from the GEF. It is this cultural or attitude change which is the most coveted project outcome, as energy efficiency is now firmly on the agenda. The savings in energy and GHG emissions from these actions, taken outside the project timeframe and scope, may not be quantifiable, but their resultant benefits to the community cannot be ignored.

6.5 Case Studies

Two case studies from the Climate Actions project, one with good success and one with limited success, were examined. The factors which may have influenced the two different outcomes were determined and compared with the major factors identified above. The influencing factors in the case studies were found to be similar to those identified in this analysis, thus validating the research findings. Detailed description and discussion of these case studies can be found in Appendix I.

[21] More than one shop owner complained about a very "hot" shop in the morning, as the many refrigerators vented heat from the condensers into the shop space overnight. After installing timers on the soft drink refrigerators, the shops were no longer so hot in the morning that the air-conditioner had to be switched on to cool it down in the summer.

6.6 Future Improvements

It seems that the FWA is a well developed approach, which is effective in assisting SMEs to make energy efficiency improvements. This view is supported by the qualitative and quantitative analysis, as well as business feedback. However, there is scope for some fine-tuning of the implementation of the approach.

Three experts, as well as the seven businesses, were canvassed for their opinions on the FWA and ideas for future improvements. The businesses were very pleased with the FWA, and did not volunteer any suggestions for improvement. However, some insights were gained from the results of the expert survey. These are discussed in the following paragraphs:

1. *It may be a good idea to categorise the targeted SMEs according to size, and further customise the approach to meet the different needs of the various categories.*

   The customisation of the FWA for the different sizes of business makes good sense, as the priorities and attitudes seem to differ from micros and small-sized, to medium-sized SMEs. This research has shown that the smaller SMEs are willing to make behavioural changes and low-cost technology changes. However, they are reluctant to make medium- or high-cost changes, due to their high upfront cost. The converse is true of their larger counterparts. Medium-sized SMEs tend to go for high-cost technology changes, which tend to yield much larger energy savings, but take longer to plan and implement. Therefore emphasis may be put on the

specific strategies which are most effective in the different sized SMEs during engagement, to minimise effort and maximise results.

2. *Further research is required to increase the number of EE products and expand the lists of local suppliers, e.g, air-conditioning specialists who are EE-minded.* More research into some of the other specialist areas commonly found in SMEs, such as refrigeration and air-conditioning, would add to the existing database of knowledge. The project manager can build up his/her network of EE-minded specialists and compile a broader list of local suppliers. The GEF and other personnel involved in such projects could receive regular product updates from the EE network (by email). With so many new products coming on the market, practitioners need to stay informed of the latest developments and prices, so that they can pass on this information to the businesses.

3. *A longer engagement period may lift the actions rate, as some of the actions take a long time to implement, such as those which require some financial planning.* The project engagement period, unfortunately, is restricted by the terms and conditions attached to government project funding. Most State and federally funded projects are required to complete the project, and report, in ten to fourteen months. For organisations, such as the SMRC, which has little or no internal project funding, there is little chance of an extended engagement period beyond that timeframe. However, some State governments are now launching their own initiatives in SME energy efficiency. An example is the 'Energy Efficiency for Small Business Program' developed and run by the New South Wales Department of Environment, Climate Change and Water (DECCW 2009). This seems to be a

well-funded project, which offers a similar facilitative walkthrough approach, although the business makes a small contribution toward the audit. A rebate is offered for some EE improvements to eligible participants, which also addresses the cost barrier. It would be interesting to evaluate the impacts these additional strategies of the business' small contribution toward the audit cost, and the addressing of the cost barrier, have on the project's success.

4. *On-going support after the completion of the project (engagement period) may be required.*

   The provision of on-going support, beyond the project timeframe, is difficult to achieve for organisations which rely on external project funding. However, State and federal governments are well placed to set up on-going support for SMEs, perhaps in the form of an information hotline or help desk.

In summary, the FWA seems to be well developed and has been very effective in instigating EE changes in SMEs. Some fine-tuning of its implementation may be useful, especially in customizing the strategies to suit the size of the SMEs; a targeted, broader knowledge base through further research for the local suppliers of EE products; a longer engagement period; and the provision of on-going support for the businesses.

Chapter 7 Adaptation of the FWA to Other Sectors

7.1 Introduction

Considering the success of the FWA in engaging SMEs in energy efficiency measures, the logical question to ask is whether it can be adapted to other sectors. Will it transfer well to larger businesses, or can it be adapted for energy efficiency for householders? This chapter will explore the possible adaptation of the FWA and how this may be achieved.

7.2 Possible Adaptations of the FWA

The adaptation of the FWA to achieve better energy efficiency in other sectors is a real possibility. The emphasis of the FWA is on building a good relationship between the facilitator and the target audience, with the latter taking ownership of the engagement process. So any potential adaptation of the FWA should also adopt a similar ethos.

This research has shown that some of the FWA strategies, walkthrough audit and face-to-face conversations, worked really well in instigating behavioural changes, while facilitation has been successful in effecting technology changes. Follow-up is important in keeping energy efficiency on the agenda. It seems then that the best mode of adaptation would be to apply, or put particular emphasis on, the appropriate strategies that would reach the target audience and effect the desired changes.

7.3 FWA for Larger Businesses

Larger businesses have a more hierarchal structure, with layers of management and a larger workforce. Therefore, a working relationship with the facilitator may be confined to one, or a small group of 'champions'. The 'champion' needs to have some authority for making changes, and have full support of senior management for this to work.

As energy efficiency is not likely to be the company's core business, there is unlikely to be any in-house expertise, nor will it be on the firm's agenda. Facilitation, to link up with specialist suppliers, is still needed for large business engagement, if technology changes are to be effected. A more detailed energy audit may also be needed to target the changes toward areas of major energy use, and to ascertain the potential savings from proposed technology changes. The latter can be put forward as the business case to persuade management of the merits of the proposed changes, or to secure finance.

Behavioural changes through raising energy awareness in the workforce can also be achieved, but the size of the audience poses a challenge for the facilitator. Perhaps this is where a series of workshops, which raise general energy use awareness, and include energy efficiency strategies in the workplace and in the home, may be appropriate. Follow-up will also be necessary to keep the champion motivated, and an internal incentive system, such as awards, may be developed to keep energy efficiency on the agenda.

In very large businesses an implementation committee composed of site representatives may be an effective way of sharing information and providing on site communication with the GEF. For such businesses an Energy Management Plan may be a statutory requirement of the Energy Efficiency Opportunities Act (2007).

7.4 FWA for Householders

Abrahamse's (2007) research on a household energy efficiency study in the Netherlands reported the "relative success of tailored intervention, … and a personalised approach" with householders. Therefore, it is envisaged that an approach similar to the FWA would be effective in improving energy efficiency in this sector.

Householders are akin to SMEs, in that the facilitator will be able to engage directly with the decision maker, and build a working relationship. It is also likely that a walkthrough audit and face-to-face conversations will instigate behavioural and low-cost technology changes.

Facilitation will still play an important role in effecting medium- to high-cost technology changes. Without any energy expertise, the householder needs support in answering some of the many questions they may have about EE products and services. They also need assistance to navigate the quagmire of sales talk, and make sense of the jargon-filled product brochures.

The Australian Government's Green Loans Program (DEWHA 2009b), launched in July 2009, offers householders a free Home Sustainability Assessment (HSA), which is effectively a walkthrough energy and water audit. The program also addresses the

cost barrier of high-cost technology changes, by offering an interest-free[22] loan to implement recommended changes.

The Green Loans Program seems like the perfect opportunity for the adaptation of the FWA for householders, as the stage is already set for the face-to-face conversation during the HSA. The Assessor could be trained to take on the multiple roles of the key contact, auditor/advisor, motivator and facilitator. However, it is unclear as to the level of contact the Assessor will have with the householder after the HSA in the current program format.

[22] The Green Loans are offered interest-free for a maximum of four years, to the maximum amount of $10,000. More information can be found at the DEWHA website: http://www.environment.gov.au/greenloans/guidelines/index.html

Chapter 8 Conclusions

8.1 Introduction

The Small to Medium-sized Enterprises (SMEs) have long been seen as a hard-to-reach sector that needs assistance in improving energy efficiency (EE). Research has identified a number of major barriers facing these small businesses, and various approaches have been used to try and instigate EE actions. This research examined the effectiveness of the Facilitative Walkthrough Approach (FWA) in effecting EE changes in SMEs.

The answers to all the research questions and objectives, as set out in Chapter 1, are summarised in this chapter. These include the identification of the major barriers facing SMEs in EE improvement, and some of the most common approaches used to engage them. An objective evaluation of the effectiveness of the FWA and the Climate Actions project (SMRC 2008) was carried out using a set of Indicators of Success developed during this research. The major factors of success and future improvements of the FWA were also identified, and the prospects of future adaptation to other sectors were explored.

Whereas the FWA was found to be effective in addressing many of the major barriers, the cost barrier was not really addressed. As previous studies have already identified cost as a major impediment for better EE in SMEs, further research into the options for addressing this barrier is warranted. Other research opportunities include the expansion of successful FWA strategies, such as additional web-based facilitation, and on-going support for the businesses beyond the project timeframe.

With government policies shifting focus again to business energy efficiency, the time is ripe for the development of, not just a National Strategy on Energy Efficiency (COAG 2009), but also national networks of facilitators, program developers and EE professionals who can share their knowledge and experience in EE engagement. The IOS may also be used to identify successful strategies which can be used in future project development.

8.2 Barriers Facing SMEs in EE Improvement

Current research (see Chapter 2) shows that the major barriers facing SMEs in improving energy efficiency in their businesses are as follows:

- Cost is identified as one of the most important barriers. However, a distinction should be made between the real cost of EE solutions, and the perceived cost of EE changes.
- Lack of time (and human) resources is another one of the most important barriers identified in recent research. This is particularly so for the micro- to small-sized SMEs.
- Lack of awareness is another major barrier, as most businesses do not relate the size of their energy bill to their energy use.
- Lack of knowledge, due to a lack of EE expertise in the business is a common barrier, as it is unlikely that EE is part of their core business.
- Lack of access to specialist suppliers of EE products and services also poses as a major barrier. Without a list of suppliers, the business owners do not know where they can purchase the best energy saving solutions.

As a result of all these barriers, businesses often lack motivation to make EE changes without external intervention or assistance.

8.3 SME Engagement Approaches and Their Success

A number of different approaches have been used for engaging SMEs in energy efficiency measures (see Chapter 3). These include the workshop/seminar approach, traditional walkthrough without facilitation, the FWA and the web-based self-assessment approach.

Due to the different methodologies and lack of standardized reporting, it is difficult to work out which approaches work better than others. In order to compare the relative success of different projects with similar aims, a set of universal indicators needs to be developed.

This research set out to develop a number of 'universal' Indicators of Success to measure the effectiveness of an approach in instigating EE changes in SMEs. The Facilitative Walkthrough Approach (FWA) and the Climate Actions project were then reviewed using these Indicators of Success to see if they have been as successful in effecting changes as reported by the program developers. The research also examined the major factors of success of the FWA, and explored future improvements, as well as possible adaptation to other sectors.

8.4 Indicators of Success

Two sets of Indicators of Success were developed: one for assessing the success of an approach in instigating EE improvements in the individual businesses, the other for assessing the project's success in reaching its target audience, instigating actions and saving energy in the businesses (see Chapter 4).

The normalised sum of five weighted Business Success Indices gives an overall Business Success Score (BSS) for each business being assessed. The Indices are:

- Behavioural Change Index (BCI) is a measure of the no-cost actions taken.
- Low-cost Technology Change Index (LTCI) is a measure of the low-cost actions taken e.g. standard 24-hour timers.
- Medium-cost Technology Change Index (MTCI) is a measure of the actions taken which require moderate financial outlay by the business, e.g. plastic strip curtains
- High-cost Technology Change Index (HTCI) is a measure of the actions taken which require substantial financial commitment by the business, e.g. major equipment upgrade, lighting retrofit.
- Cultural Change Index (CCI) is a measure of future actions planned, or actions taken by the participant outside of the business, such as at home, or on other premises.

The Project Success Indicators give a measure of the overall success of a project in achieving its aims to recruit and reach its audience, as well as assisting them in saving energy through better energy efficiency. They are independent of the approach and strategies used in achieving those aims. The Indices are:

- Target Business Index – a measure of the success of the recruitment strategies.
- Business Actions Index – a measure of the success of the engagement strategies in getting the EE message through to the audience within the project timeframe, based on the percentage of businesses taking actions.
- Energy Saving Index – a measure of the effectiveness of the approach in saving energy.

The objective evaluation of these Indicators for similar projects would give some idea of their relative success, regardless of their methodology and engagement strategies.

8.5 Effectiveness of the FWA

The FWA, as implemented in the Climate Actions project, was assessed for its effectiveness in assisting SMEs in improving energy efficiency (see Chapter 5). The research showed that the FWA strategies of walkthrough audit, face-to-face conversations, facilitation and follow-up, were successful in overcoming the major barriers facing SMEs.

Qualitative and quantitative analyses of the Climate Actions data and the Business Participant Survey showed that:

- The Climate Actions SMEs face all the major barriers identified in current research.
- Those barriers (cost, lack of time resources, lack of awareness and knowledge of energy matter, and the lack of access to specialist suppliers) led to a lack of motivation in the SMEs to make EE improvements.

- The FWA was very successful in assisting the (surveyed) businesses to overcome the barriers.
- The individual business' Indicators of Success showed that the surveyed businesses made behavioural, technology and cultural changes during the Climate Actions project, and in the twelve months after its completion.
- The Climate Actions project was very successful at reaching (94% of) its target audience and instigating EE actions (in 76% of the businesses). A rough estimate of 20% energy savings was made using reported cost savings, as a percentage of overall annual energy spend.
- The 'real' cost barrier was not addressed by the FWA. In fact, it cannot be easily addressed unless EE products receive government subsidies, or their production costs fall due to economies of scale, as demand grows.

Overall, the FWA seems to have been very successful in assisting SMEs to overcome the many hurdles they face on their journey to better energy efficiency, although the barrier posed by the high cost of EE technologies still remains.

8.6 FWA's Major Factors of Success and Future Improvements

The FWA's tailored intervention and personalised approach seem to have been effective in engaging the individual businesses (see Chapter 6). Its success may be attributed to a suite of strategies, which complement each other in instigating EE changes.

The FWA has four main strategies: a walkthrough energy audit, face-to-face conversations, facilitation and follow-up. These worked in tandem to achieve good

success in instigating behavioural and technology changes in the Climate Actions project (SMRC 2008). The Green Enterprise Facilitator (GEF) played many important roles in that project, first as the key contact, then as the energy auditor/advisor, the facilitator and motivator.

By paying a personal visit to the business, the GEF overcame the 'time' barrier as the owner did not have to leave the shop. The walkthrough energy audit was useful in raising the awareness of energy use in the business. Energy monitoring and expert advice offered by the GEF raised awareness, and bridged the EE information and knowledge gaps. By conducting the face-to-face conversations, the Facilitator was able to put EE firmly on the business' agenda and break down the 'perceived cost' barrier by pointing out that EE could be achieved without huge financial outlay. Follow-up telephone calls and visits, as well as positive feedback, kept the owner motivated throughout the engagement process.

Whilst all the above non-facilitative strategies worked well in effecting behavioural changes, facilitation was crucial in effecting technology changes. Data analysis showed that some form of facilitation was necessary to instigate technology changes in the surveyed businesses, regardless of whether they are low-cost, medium-cost or high-cost. The facilitation may be in the form of research on EE products and services and providing a list of local suppliers, linking the business to the specialist suppliers, or making some EE products available to the businesses on-site.

The long-term interaction between the GEF and the business owner also meant that a good working relationship was formed in most cases. Trust was gradually built up as

the owners began to see the positive consequences of their EE actions, and realised that the GEF was working with them for their benefit. Over time, the owner re-aligned his/her attitude with the GEF's toward EE, and became self-motivated. The latter was evident in the number of reports from the businesses of further EE actions taken in the business, and in other areas of their lives, after the completion of the project.

Overall, the FWA seems to be well developed and effective in instigating EE changes in SMEs. However, some fine-tuning of its implementation may render it more effective still. A panel of EE practitioners made the following suggestions:

- The sub-categorising of SMEs may be useful so that certain FWA strategies may be emphasised depending on the size of the SMEs targeted. For example, this research has shown that micro- and small-SMEs have different priorities from medium-SMEs, and are more likely to make behavioural and low-cost technology changes, so the focus of the engagement could be on achieving those, rather than trying to instigate high-cost changes. Likewise, for the medium-sized SMEs, less emphasis could be placed on behavioural and low-cost technology changes. Instead, the focus could be on instigating high-cost technology changes.
- A broader knowledge base of the latest EE products and local specialist suppliers is needed so that the knowledge and information can be passed on to the businesses. This can be achieved through further research into the areas of energy use that are commonly found in SMEs, such as air-conditioning and commercial refrigeration.

- A longer period of engagement may yield more actions as some of the (high-cost) technology changes require longer term financial and logistical planning to take effect. This is likely to be the case, however, non-State or federal government organisations who rely on project funding are hampered by the project terms (normally no more than twelve to fourteen months) imposed by funding organisations.
- On-going support for the businesses may be needed to provide advice and assistance for more EE actions. State and federal governments are well placed to set up on-going support for SMEs, perhaps in the form of an information hotline or help desk.

8.7 Adaptation of the FWA to Other Sectors

There is good prospect for the adaptation of the FWA to achieve better energy efficiency in the larger business and residential sectors, although some of the strategies may have to be modified to suit the constraints in the specific sector (see Chapter 7).

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In larger businesses, a working relationship with the facilitator may be confined to one, or a small team of 'champions'. Facilitation, to link up with specialist suppliers, is still needed for large business engagement, if technology changes are to be effected. A more detailed energy audit (than a walkthrough) may also be needed to target the changes toward areas of major energy use, and to ascertain the potential savings from proposed technology changes. The latter can be put forward as the business case to persuade top management of the merits of the proposed changes, or to secure finance. (This is essential for high cost items)

Behavioural changes through raising energy awareness in the workforce can also be achieved, but a different engagement approach may be needed here. A series of workshops, which raises general energy use awareness, and include energy efficiency strategies in the workplace and in the home, may be more appropriate. Follow-up will also be necessary to keep the champion motivated, and an internal incentive system, such as awards, may be developed to keep energy efficiency on the agenda.

Householders are more akin to SMEs than large businesses. A working relationship can be built with the household's decision-maker. A walkthrough audit and face-to-face conversations will more than likely be sufficient to instigate behavioural and low-cost technology changes. However, facilitation will still play an important role in effecting medium- to high-cost technology changes. The non-expert householder needs support in answering questions about, and choosing the right EE products and services. They also need some 'hand-holding' in order to take the first steps on their journey to better EE.

8.8 Further Research

8.8.1 Fine-tuning of the Indicators of Success

Further research, such as the application and fine-tuning of the Indicators of Success (IOS), developed in this dissertation, would be useful. A number of projects could be appraised using the existing evaluation and weighting system to ascertain whether the business and project EE outcomes are well represented by the IOS. The 'universality'

of the IOS can then be established, or the system improved, depending on the research outcomes.

The establishment of such a 'universal' system and some form of standardised project reporting would allow for easy comparison of projects, and identification of successful strategies. It is likely that, just as the FWA is a hybrid approach of traditional and alternative engagement strategies, new combinations of complementary strategies may be found for other sectors or audiences.

8.8.2 Best Options to Address Cost Barriers

Previous research has shown that cost is one of the most important barriers to better energy efficiency in SMEs. Yet, this barrier has not been satisfactorily addressed in Climate Actions or other similar projects in the recent past. A current exception is the 'Energy Efficiency for Small Business Program' by the New South Wales Department of Environment, Climate Change and Water (DECCW 2009), which is offering a percentage rebate for some high-cost technology changes.

Research into the best way to address this difficult-to-overcome barrier would be beneficial for future project development. The research could include: a review of past approaches to address the cost barrier, compare the success of each approach (such as different levels of subsidy/rebate, or different mechanism), explore new approaches (e.g. market-based 'carbon tax' on non-EE technologies, etc), and an economic analysis of the cost-effectiveness of these approaches.

8.8.3 Additional Web-based Facilitation

The FWA has achieved obvious success in engaging SMEs in making energy efficiency gains. However, as one of the experts surveyed pointed out, it is a very labour intensive approach. Future research could be directed toward incorporating other, less labour intensive strategies into the FWA without compromising the tailored intervention, or the personalised nature of the approach.

With the exception of some micro SMEs[23], internet access is almost universal in small businesses. It makes sense then to incorporate the internet technology into the facilitation process. The web-based facilitation would complement, not substitute for, the existing face-to-face and telephone options. However, its effectiveness and whether it will maintain the feel of a personalised approach for the business owner remains to be seen.

Research into the development of web-based facilitation, such as the establishment of a resource website for energy efficiency may be useful for all SMEs. The primary purpose of the website would be to serve as a portal for SME owners to access personalised advice, perhaps by email correspondence with a case officer. It could also be a resource library that contains some Frequently Asked Questions (FAQs), descriptions of EE products, a list of local suppliers for specialist EE products, and a calculator for estimated energy and GHG savings for EE actions taken.

[23] Many of the Climate Actions micro SMEs did not have internet access. Some of the owners also have English as a second language, and may have trouble understanding written information, such as that found on the internet or information brochures.

Research on the uptake of this web-based strategy, and its effectiveness in instigating change in the businesses would be beneficial for further development of the FWA. If the strategy proved to be successful, then it can be added to the suite of effective FWA strategies which could be employed.

8.8.4 On-going Support

Some form of on-going support for SMEs beyond the engagement period would be beneficial for keeping EE on the agenda. Support would be particularly useful for those businesses who would like to make further EE changes after the completion of the project. Even with increased awareness and knowledge about energy efficiency, SME owners would benefit from more advice and facilitation to take more actions. Exactly what form of support is required and who should provide it are both areas that deserve some attention from researchers.

8.9 Other Relevant Issues

8.9.1 Development of National Networks

Much of the information that the facilitator gathers can be shared with their counterparts in other organisations. The sharing of such resources would free up much time and money to spend on facilitation, and other interactions with the SMEs. The formation of a national network of facilitators and practitioners would be useful especially if the FWA were to be become more widely used.

A national network for program developers could also be formed. There is an obvious need to share success stories and lessons learnt from past projects. This would help to

reduce the duplication of research and development of different engagement strategies, saving time and financial resources in the long run. In fact, there could be other hybrid approaches which incorporate known successful strategies to target a specific audience.

These networks could be internet-based virtual networks and forums where discussions are held in a chat room or other suitable formats. A good model to base it on is the Canadian-based Community Based Social Marketing online forum (CBSM 2009), where like-minded people 'meet' to discuss sustainability issues and engagement strategies. A similar Australian-based forum could also be set up for EE professionals to share their knowledge and experience.

8.9.2 Government Policies

In July 2009, the Australian Government launched the National Strategy on Energy Efficiency (COAG 2009). In recognition of the potential for energy efficiency gains, the business component of the Strategy "will assist companies and smaller businesses to address market impediments to energy efficiency uptake".

The Strategy promises to put in place initiatives that will assist businesses in gaining adequate knowledge, skills and capacity to operate in a low carbon economy. In its measures table, it specifies that businesses will be provided with support to assist them in improving their energy efficiency and State and Territory jurisdictions will implement initiatives to improve the effectiveness of energy efficiency support programs targeted at small and medium sized enterprises (SMEs).

With the long-awaited government policy focus again shifted toward business energy efficiency, and the major barriers facing SMEs already identified in research, the time has come for the development of really effective programs to assist this hard-to-reach sector. Objective evaluation of the various approaches to achieve this aim is necessary to ensure that public money and efforts are spent on implementation of the most promising initiatives and support. By using a set of universal indicators of success, similar to the one developed in this research, the most successful strategies may be identified. A suite of appropriate strategies for each target audience can then be collected for the development of future projects.

References

Abrahamse, W (2007), Energy Conservation through Behaviour Change: Examining the effectiveness of a tailor-made approach. Doctorate thesis, Rijksuniversiteit Groningen, The Netherlands.

AusIndustry (2008), Re-tooling for Climate Change: Customer Information Guide, Canberra. Last accessed on 26 February 2009 at: http://www.ausindustry.gov.au/InnovationandRandD/Re-ToolingforClimateChange/Documents/Customer%20Guide/RCC%20Customer%20Guide%20-%20December%2008.pdf

Australian Bureau of Statistics (2002), Small Business in Australia 2001, Chapter 2, Catalogue No. 1321.1, Commonwealth of Australia, Canberra. Last accessed on 28 February 2009 at: http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/C639A01ED725ADABCA256C54000336D1/$File/13210_2001.pdf

Australian Government (2008), Climate Change Action Fund, Chapter 18, Carbon Pollution Reduction Scheme White Paper, Canberra. Last accessed on 25 February 2009 at: http://www.climatechange.gov.au/whitepaper/report/pubs/pdf/V2018Chapter.pdf

Australian Institute of Criminology (AIC 2003), Hybrid Strategies. In: Improving Environmental Performance, Preventing Environmental Crime, AIC Research and Public Policy Series No. 27, Chapter 6, Canberra. Last accessed on 20 April 2009 at: http://www.aic.gov.au/publications/rpp/27/ch6.pdf

Community Based Social Marketing (2009), Fostering Sustainable Behaviour web forum. Last accessed on 28 September 2009 at: http://www.cbsm.com/public/world.lasso

Council of Australian Governments (COAG 2009), National Strategy on Energy Efficiency, Commonwealth of Australia, Canberra. Last accessed on 22 October 2009 at: http://www.coag.gov.au/coag_meeting_outcomes/2009-07-02/docs/Energy_efficiency_measures_table.pdf

Department of Climate Change (2006), Greenhouse Accounts - National Inventory by Economic Sector 2006, Commonwealth of Australia, Canberra. Last accessed on 28 February 2009 at: http://www.climatechange.gov.au/inventory/2006/pubs/inventory2006-economic.pdf

Department of Environment, Climate Change and Water, New South Wales (DECCW 2009), Energy Efficiency for Small Business Program. Last accessed on 28 September 2009 at: http://www.environment.nsw.gov.au/sustainbus/smallbusenergy.htm

Department of Environment, Water, Heritage and the Arts (DEWHA 2008), Annual Report 2007-08, Volume 1, Outcome 1.1, Canberra. Last accessed on 28 February 2009 at: http://www.environment.gov.au/about/publications/annual-report/07-08/pubs/vol1-climate-change.pdf

Department of Environment, Water, Heritage and the Arts (DEWHA 2009a), Greenhouse Challenge Plus. Last accessed on 29 September 2009 at: http://www.environment.gov.au/settlements/challenge/members/index.html

Department of Environment, Water, Heritage and the Arts (DEWHA 2009b), Green Loans home page. Last accessed on 29 September 2009 at: http://www.environment.gov.au/greenloans/

Department of Resources, Energy and Tourism (DRET 2009), Energy Efficiency Opportunities Program website. Last accessed on 22 October 2009 at: http://www.ret.gov.au/energy/efficiency/eeo/pages/default.aspx

Edith Cowan University (ECU 2008), Green Advantage: media release, 18 March 2008. Last accessed on 21 September 2009 at: http://www.ecu.edu.au/pr/mediareleases_show.php?release=0000000495

Favacho, S. (2009), Private communication with Industry Project Coordinator, Perth Region NRM.

Favacho, S. & Pekin, K. (2008), Private communication with Industry Project Coordinators, Perth Region NRM.

Green Manitoba (2009), Smart Shops Pilot Findings, and Recommendations for a Small Commercial Retail Program, a report by the Manitoba Government, Canada.

Living Smart (2009), Publication and data. Last accessed on 21 September 2009 at: http://www.livingsmart.org.au/pubdata.htm

Instinct and Reason (2009), SME Energy Efficiency Project: final report. Prepared for NSW Department of Environment and Climate Change, by Instinct and Reason, Surrey Hills, NSW.

Grow Me the Money (2007), Media Release 10 April 2007. Last accessed on 20 April 2009 at http://www.growmethemoney.com.au/MediaMentions

Grow Me the Money (2008), Planting the Seeds for Sustainability: A Report on the First 18 Months, East Melbourne. Last accessed on 22 April 2009 at: http://www.growmethemoney.com.au/Assets/29/1/GMTM_PUBLIC_REPORT_20083009.pdf

Jennings, S. (2008), Private communications with the Climate Wise Team's strategic researcher at the Southern Metropolitan Regional Council.

Jennings, S. & Bustamante, L. (2007), Project briefing and private communication with the strategic researcher and previous Green Enterprise Facilitator for the Climate Actions Pilot Project, April 2007.

Ministerial Council on Energy (2004), Statement on National Framework on Energy Efficiency Overview Plan of Stage One Measures 2005-2007, December 2004. Last accessed on 10 April 2009 at: http://www.ret.gov.au/Documents/mce/energy-eff/nfee/_documents/MCEStatementonNFEEOverviewStage1_dec04.pdf

Productivity Commission (1996), Energy Efficiency for SMEs, Small Business Research Program, Commonwealth of Australia, Canberra.
Productivity Commission (2004), Letter to the National Framework for Energy Efficiency Secretariat, 12 March 2004, Canberra. Last accessed on 10 April 2009 at: http://www.ret.gov.au/Documents/mce/energy-eff/nfee/_documents/ws_productivit.pdf

Sirolli, E. (1999), Ripples from the Zambezi, New Society Publishers, Stony Creek, CT, USA.

Southern Metropolitan Regional Council (2008), Climate Actions Project Final Report, Perth, Western Australia. Last accessed on 28 February 2009 at: http://www.climatewise.net.au/CA-report.htm

Young, D (2003), Toward A National Framework for Energy Efficiency, Sustainable Energy Authority, Powerpoint presentation, 7th April 2003. Last accessed on 10 April 2009 at: http://www.ieadsm.org/Files/Exco%20File%20Library/Workshop%20Sydney/Melbourne,%20Australia,%20April%202003/David%20Young.pdf

Zaman, A (2009), Private communication with the Climate Wise Team's regional greenhouse coordinator at the Southern Metropolitan Regional Council.

Appendix I

Case Studies

Two Case Studies From The Climate Actions Project

Background

This research showed that facilitation and the building of a good working relationship with the businesses were two major factors of success in engaging SMEs in energy efficiency measures. In order to ascertain whether this is a reasonable reflection of reality, two case studies from the Climate Actions project were examined.

The two case studies were chosen for their difference in outcomes, one with good success and one with limited success in EE improvements. They also share common characteristics:

- They are both being micro SMEs
- Both premises are leased
- They are both traditional delis, with similar refrigeration and lighting requirements
- The owners of both businesses faced the same major barriers of time and cost constraints, had similar levels of unawareness of energy use, EE knowledge, and lack of access to specialist suppliers
- In both case, the GEF provided energy advice, assistance, facilitation and a similar level of support, in terms of visits and telephone correspondence

The factors which influenced the two different outcomes were investigated to ascertain if these correlate with the major factors of success identified in the research analysis.

Case Study 1

Case study 1 is that of respondent #2 of the business participant survey, who had been operating the micro business with her husband in a suburb of Kwinana for three years. The small deli has three part-time employees and is open seven days a week.

The owner had little awareness of their energy use, and did not have any environmental awareness or understanding of greenhouse issues. However, the shop did have a solar hot water system on the roof, which was installed by the previous shop owner, and they have the booster turned off permanently as they have very low hot water requirements. The owner was receptive to the EE suggestions once the financial and environmental benefits were communicated to her.

Many opportunities for EE and environmental improvements were found and discussed with the owner during the engagement. Over a period of sixteen months, and a number of visits and telephone calls, a good working relationship developed between the GEF and the owner. By the end of the engagement period, the owner had taken numerous recommended actions to reduce energy use and reduce their environmental footprint. During the survey, she reported that they had taken more actions at the shop after the completion of the project.

The opportunities and actions taken are shown in Table A1.1, in direct comparison with those in Case Study 2.

Case Study 2

Case study 2 is that of respondent #5 of the business participant survey, who had been operating the micro business in a suburb of Cockburn for one year. The small deli has two owners (business partners) and 1 casual employee and is open seven days a week.

The owner had little awareness of their energy use, and did not have any environmental awareness or understanding of greenhouse issues. However, they were concerned about the size of their energy bills and the thermal comfort in the shop. She reported that the shop could stay very warm overnight in the summer, so that they needed to run the air-conditioner overnight to prevent the chocolates from melting. The owner was receptive to the EE suggestions once the rationale and the financial, as well as environmental, benefits were communicated to her.

Many opportunities for EE and environmental improvements were found and discussed with the owner during the engagement. Over a period of sixteen months, and a number of visits and telephone calls, a good working relationship developed between the GEF and one of the owners. This owner was one of only two Climate Actions participants who purchased the timers for turning off the soft drink refrigerators overnight, with assistance from the GEF. As a result of this action, the shop did not get as hot overnight, and she no longer ran the air-conditioner overnight. She was very pleased with the improvement in EE and reduction in her energy bills. However, although other opportunities existed in the shop, not many more actions were taken there, even though she personally became more EE aware and took actions at home. The opportunities and actions taken are shown in Table A1-1, in direct comparison with Case Study 1.

Table A1-01 Energy efficiency opportunities and actions taken in the two case studies

EE opportunities	***Actions Taken***	
	Case Study1	*Case Study 2*
Behavioural changes		
Decommission appliances	✓	✗
Turn Light off when not needed	✓	✓
Turn off appliances overnight	✓	✓
Turn off appliances when not in use	✓	✓
Delamp fluorescent lights	✓	✗
Adjust A/C thermostat	*N/A*[24]	✓
Reduce hours of use for A/C	✓	✓
Turn off standby power	✓	✓
Commence recycling	✓	✓
Low-cost Technology changes		
Install timers on refrigerators	✓	✓
Medium-cost Technology changes		
Install plastic strip curtains	✓[25]	✗
High-cost Technology changes		
Lighting retrofit	✗	✗
Energy efficient upgrade	✓	✗

Discussion

As shown in Table A1-1, better success in instigating EE changes were achieved in Case Study 1 compared to Case Study 2, even though both owners reported taking EE actions at home by the end of the engagement period. The latter can be regarded as an indication of cultural change, as both owners seem to be making future decisions with EE in mind. Yet in Case Study 1, all the identified behavioural change, low- to high-cost technology changes were made, but not so in Case Study 2.

The "less successful" engagement outcome of Case Study 2 could perhaps be attributed to the fact that only one, out of two, of the owners was really "engaged"

[24] The evaporative air-conditioning system in Case Study 1does not have an adjustable thermostat.
[25] The owner in Case Study 1 had committed to taking this action at the time of the survey.

with the Climate Actions project. When the business partner was interviewed for the business participant survey, it was obvious that she was not interested in EE in the business. The lack of motivation on the part of the business partner may well be due to the fact that she was not the one who had the EE conversations with the GEF, so no working relationship was ever developed. As a result, this partner still lags behind in energy awareness and knowledge, and certainly did not show signs of cultural change. With one unmotivated partner, it is understandable that the changes which would have needed joint decisions, such as decommissioning appliances, delamping, and installing industrial strength plastic curtains, were never made.

By contrast, the owner in Case Study 1 is the principal decision maker, who can make executive decisions in the business. Consequently, all the behavioural and affordable technology changes were made once the GEF succeeded in helping her overcome the EE impediments.

The different actions rate had a direct influence on the energy savings: 15% reduction in the energy bill was reported by Case 1, compared to only 5% reduction in Case 2.

Conclusion

Through careful examination of the two case studies above, the factors which seemed to have influenced the outcomes were determined:

- The face-to-face conversations were successful in increasing energy awareness and knowledge, and contributed to the motivation of those who are engaged to take EE measures

- A good working relationship was formed between the GEF and the owner in Case Study 1, and one of the owners in Case Study 2, contributed to their making cultural changes
- In Case Study 1, the principal decision maker was engaged and became motivated, but in Case Study 2, only one of the two business partners was engaged and motivated, as the other partner did not really partake in the EE conversations
- The GEF was able to get the EE message through to only one of the two business partners in Case Study 2. Even though the same level of facilitation and support was provided in both cases, the lack of motivation of one half of the decision-making team was probably responsible for the lower actions rate
- No high-cost technology changes were made in either of the two case studies, due to the unaddressed cost barrier

The results of these case studies seem to support the research findings that all the FWA strategies work well together to motivate the businesses and instigate EE actions. The face-to-face conversations are necessary to provide tailored energy advice, and communication over a period of time is necessary to motivate the business. A good working relationship seems to be necessary to instigate cultural change (as demonstrated by EE actions taken elsewhere, such as at home). When all these are present, and facilitation is given, the owners are motivated and keen to make EE changes. However, the cost barrier remains unaddressed, and in the cases of micro businesses, it remains a major impediment to high-cost technology changes.

Appendix II

Business Participant Questionnaire

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Business Participant Questionnaire

www.murdoch.edu.au

Engagement of Small to Medium-sized Enterprises (SMEs) in Energy Efficiency in Australia – A Review of the Facilitative Walkthrough Methodology

The purpose of this project is to conduct a detailed review of the Facilitative Walkthrough Approach (FWA) that was used for the engagement of Small to Medium-sized Enterprises (SMEs) in energy efficiency measures. It was used in the Climate Actions project (2007-08) delivered by the Southern Metropolitan Regional Council in partnership with the Cities of Canning, Cockburn and Fremantle, and the Towns of East Fremantle and Kwinana.

As you have been a business participant in the Climate Actions project, we would like find out how you felt about the approach we took and whether it helped you take actions to reduce energy use.

We would be pleased if you could answer the following questions:

1. What issues may have prevented you from taking actions to reduce energy use at your business before the Climate Actions project? *Tick all the appropriate boxes*
   - ☐ Not aware of the amount of energy used
   - ☐ Did not know that energy use could be reduced
   - ☐ Did not know what actions to take
   - ☐ Did not know where to get more energy efficient products or services
   - ☐ Did not want to spend a lot of money on improving energy efficiency

2. In what ways did you find the energy walkthrough audit, ie looking at your appliances and work practice, useful:
   - ☐ Not useful at all
   - ☐ Discover where energy is used at your business
   - ☐ Identify areas where most of the energy is used
   - ☐ Give you ideas where energy savings can be made

3. Did the conversation you have with the Green Enterprise Facilitator help to:
   - ☐ Raise your awareness in energy use
   - ☐ Bring out your own ideas to reduce energy use
   - ☐ Give suggestions on actions which can be taken to reduce energy use
   - ☐ Encourage you to be more energy efficient

4. Did participating in the Climate Actions project help you:
   - ☐ Become more aware of energy use at your business
   - ☐ Help you realise some of your own energy saving ideas
   - ☐ Take actions to save energy at your business
   - ☐ Find or purchase energy efficient products and/or services

5. Can you think of ways we can improve the approach we used in the Climate Actions project?

_____

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_____

This study has been approved by the Murdoch University Human Research Ethics Committee (Approval No. xxxx/xx)

Appendix III

Expert Participant Questionnaire

Murdoch UNIVERSITY

Expert Participant Questionnaire

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Engagement of Small to Medium-sized Enterprises (SMEs) in Energy Efficiency in Australia – A Review of the Facilitative Walkthrough Methodology

The purpose of this project is to conduct a detailed review of the Facilitative Walkthrough Approach (FWA) that was used for the engagement of Small to Medium-sized Enterprises (SMEs) in energy efficiency measures. We would like to find out more about this approach which was used in the Climate Actions project (2007-08) delivered by the Southern Metropolitan Regional Council in partnership with the Cities of Canning, Cockburn and Fremantle, and the Towns of East Fremantle and Kwinana.

We would be pleased if you could answer the following questions:

1. Under what capacity were you working for the Climate Actions project (2007-08)? If you were not involved in the Climate Actions project, what is your experience in SME engagement?

2. What in your opinion are the barriers or issues facing SMEs on their journey to better energy efficiency?

3. Which barriers do you think are being address with the Facilitative Walkthrough Approach or another approach you are familiar with?

4. In what ways does the Facilitative Walkthrough approach differ from other approaches engaging SMEs in improving energy efficiency?

5. How does the Climate Actions project compare with similar projects using different engagement approaches in terms of success in helping SMEs take actions to reduce energy use?

6. Can you think of any improvements which can be made to the facilitative walkthrough approach?

7. Do you think the approach can be easily adapted for other sectors? If so, which sectors and can you suggest how this may be achieved?

8. Can we contact you again for follow-up and other short discussions regarding this facilitative walkthrough approach?

This study has been approved by the Murdoch University Human Research Ethics Committee (Approval No. 2009/068)